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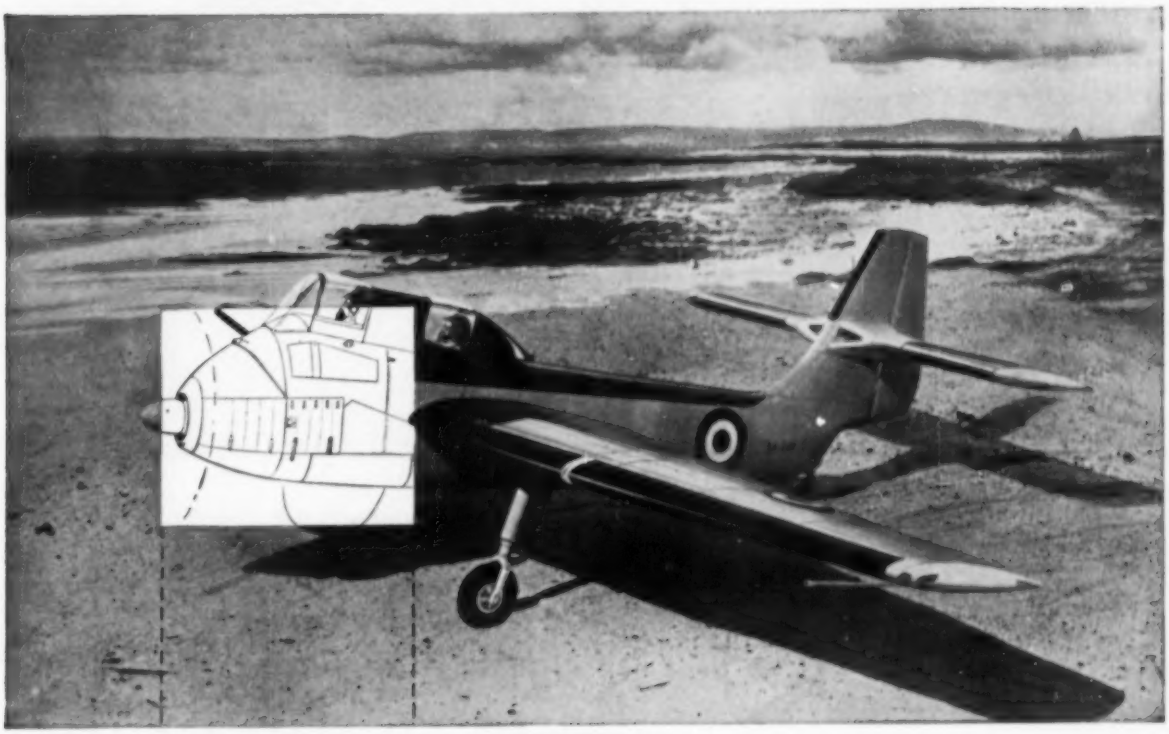

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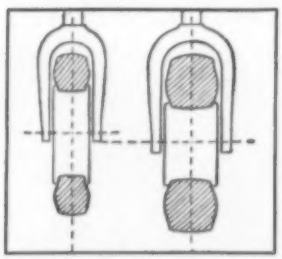

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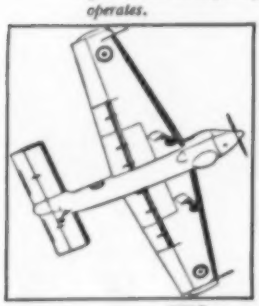

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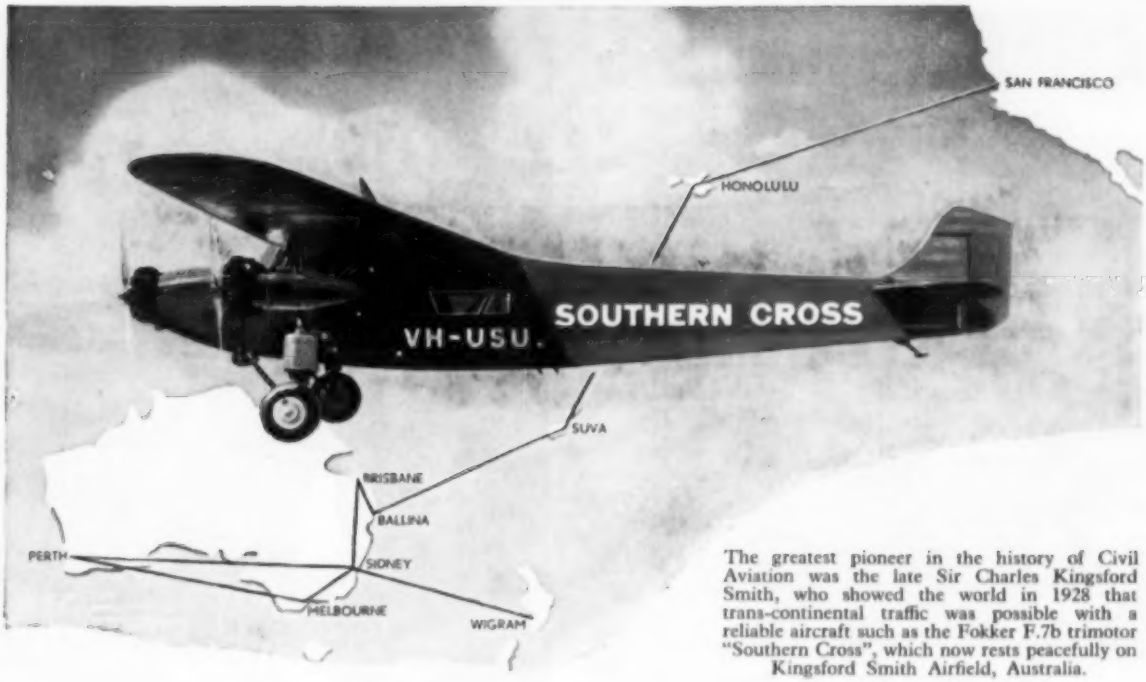

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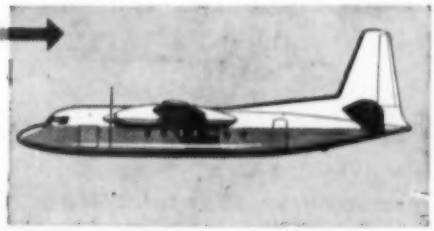

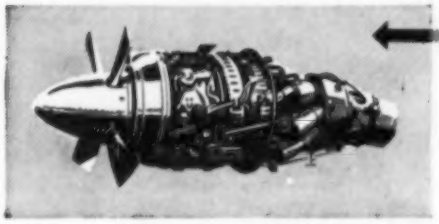

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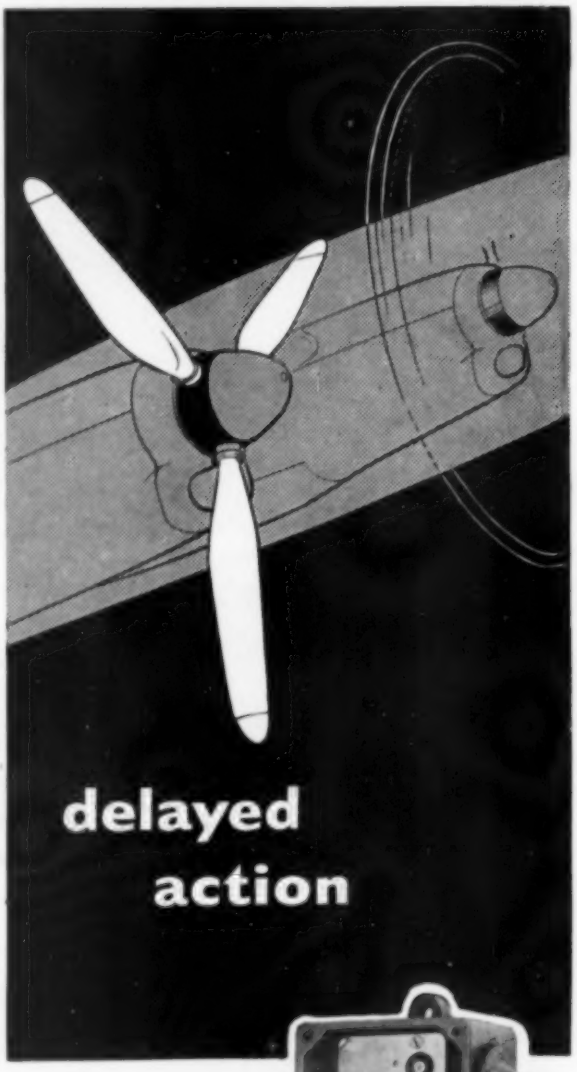

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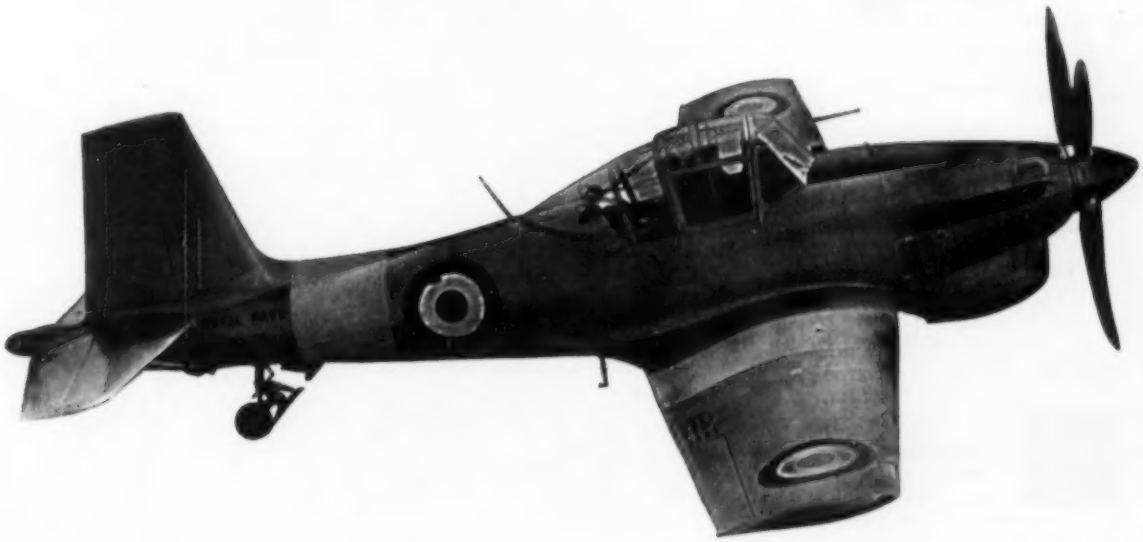

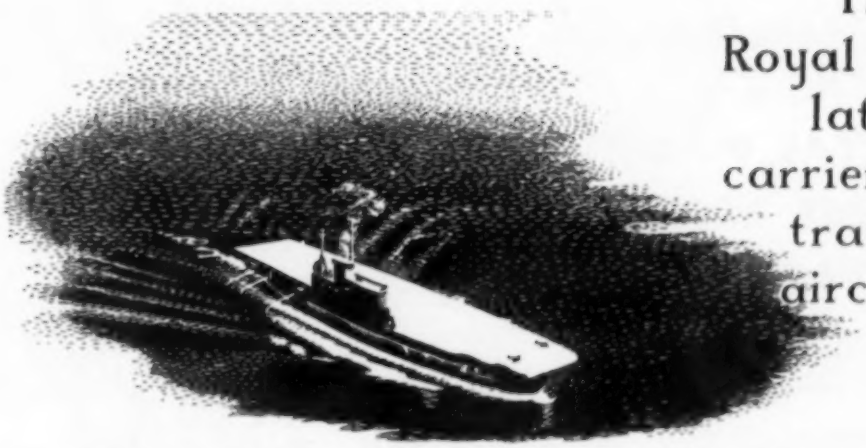

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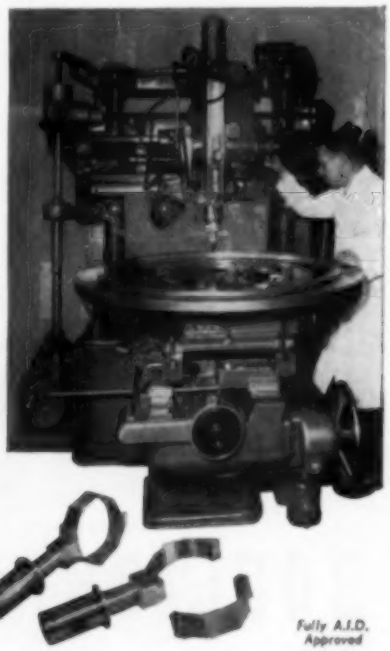

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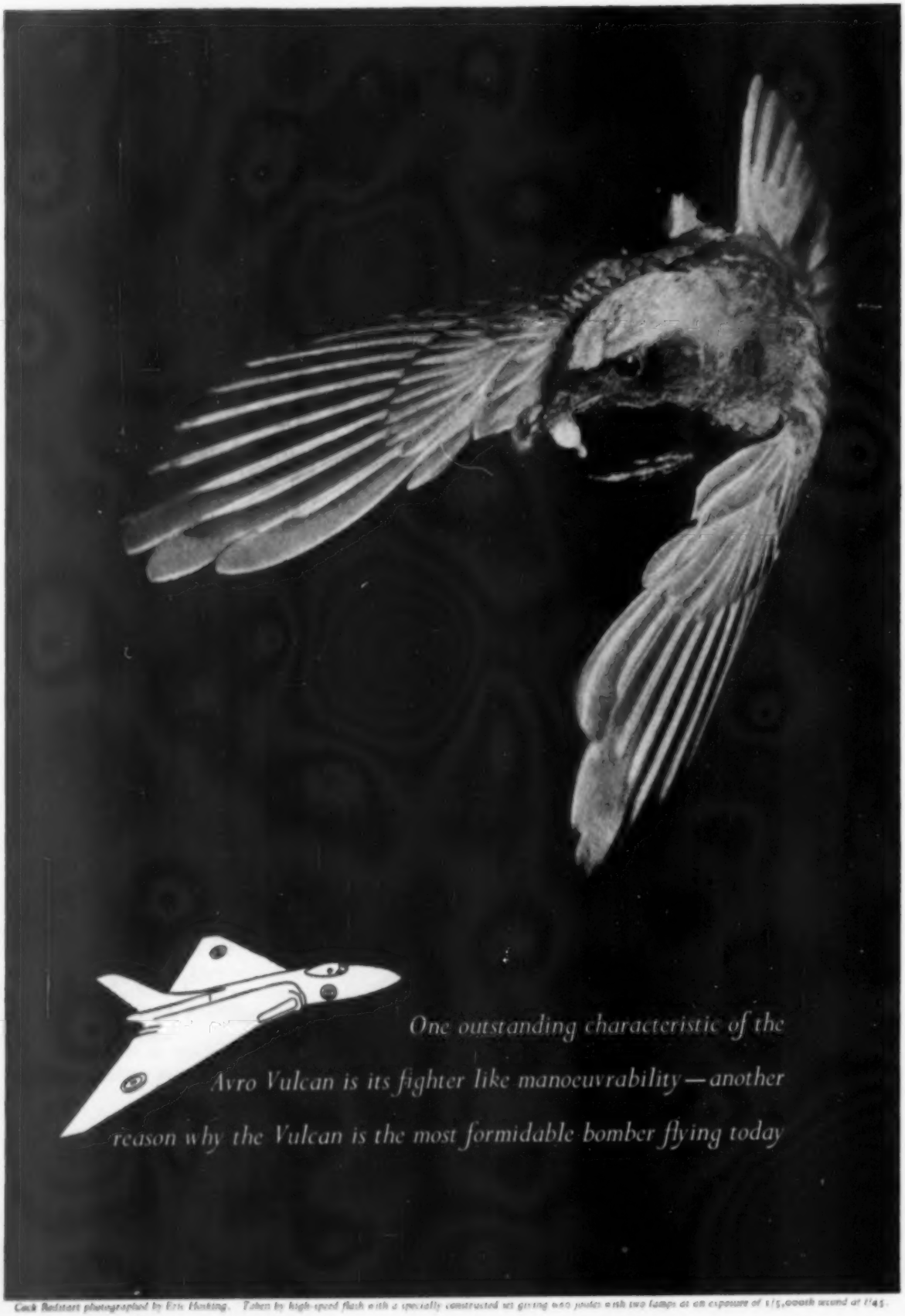
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FLIGHT
and
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Founded 1909

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The Light Aircraft Outlook

IF we have had one real regret about the progress of British aviation since the war, it has concerned the wholly disappointing condition of private and sporting flying. Most people can quote reasons for this state of affairs, and we have from time to time analysed the position in these columns. Nevertheless, not only has little or no progress been made, but in several respects ground has been lost.

Several of man's most successful enterprises, including flying itself, have developed from beginnings which at the time appeared just as unfruitful and hedged about with difficulties as does the private flying movement today. Yet the faith and exertions of a few individuals worried a way through the barriers and eventually brought their reward. Happily, private flying today has a number of tireless supporters and even one or two fairy godmothers (or fathers) as well. There is also a happy band who polish their mainly veteran machines and turn out year after year at each race meeting or competition. Certainly this is a true indication of enthusiasm, for even the winner has little prospect of making more in prize money than his bare costs.

Though fully appreciating the difficulties, we cannot help feeling that some aircraft manufacturers might have been a little more sympathetic and enterprising in this field. Beyond supporting a few important meetings with aircraft demonstrations they have shown the minimum of interest; and, with but a couple of exceptions, have produced no new aircraft in the ultra-light, light, small executive or, incidentally, agricultural classes. Sizeable and expanding markets in Europe, Africa, India, Australia and New Zealand have as a result been largely dominated by American or locally built machines.

On the credit side, acknowledgment should be given to the activities of clubs and groups—especially, of course, to the Royal Aero Club and to the Kemsley Flying Trust for continuous aid and encouragement.

At long last, events of recent weeks have started to give a real hope that the tide is on the turn, if not yet actually flowing. We refer in the first place to the Popular Flying Association's activities. With the blessing and co-operation of the M.T.C.A., the Association is sponsoring a scheme under which home-produced light single- and two-seat aircraft can be licensed and flown in this country. The first two aircraft selected, both of French design, are referred to in an article on pages 443-445. While congratulating the French designers on their products, we must express regret that it should have been necessary to turn to a foreign source when we have both experience and ability at home.

The key to the changed situation is found in the new ultra-light airworthiness procedure involving inspection of aircraft by approved licensed engineers. Reference was made to this scheme last month. While wishing to see the greatest possible freedom for responsible people who wish to build light aircraft and fly them, we would not suggest for a moment that this should be allowed without adequate safeguards for the enthusiasts in the machines or the public below. The presence of a member of the Air Registration Board on the technical committee of the P.F.A. will quell most doubts on this score.

It was appropriate that Mr. Peter Masefield should have laid down, on March 26th, the fuselage of the Hatfield Technical College's Druine Turbi. It was his committee that in 1946-47 spent so much time and trouble in preparing designs and recommendations for British club and private-owner aircraft. The Minister at that time felt unable to give the plans any support and so, like all but one of the later designs (and this through private, almost personal enterprise) prepared for the Royal Aero Club's competition, they have come to nothing.

Two other local events worthy of mention as being indicative of a new spirit in recent months are, firstly, the enthusiastic reception accorded to the Vickers Armstrongs works flying scheme, which was immediately and heavily over-subscribed, and, secondly, the progress of the Surrey Flying Club. This latter, having been expelled from Redhill Airfield, managed to increase its membership more than threefold to some 250 in spite of having no club premises until two weeks ago and no more than the share of a hangar. Only a slight turn of the tide has occurred as yet, but there is cause for new hopes. How welcome now would be even one new and modern British light aircraft!

ROLL-OUT: At present three squadrons of North American F-86D Sabre all-weather interceptors are based in the United Kingdom; this machine of the 87th Fighter/Interceptor Squadron is being slowed by its drag-chute after landing at its base at Bentwaters, Suffolk. We hope to make reference to the F-86Ds next week.

FROM ALL QUARTERS

Multi-Purpose Canberra

THE months immediately ahead will see the introduction into R.A.F. squadron service of the English Electric Canberra B.8. Officially categorized as a night intruder or "interdictor," this mark, as its designation implies, is primarily a bomber, with provision for internal and external stores and with an aiming station in the nose. Alternatively, by virtue of its four 20 mm Hispano guns (with their unequalled ammunition supply), it is a formidable ground-attack machine. Third, for good measure, provision has been made for one or more reconnaissance cameras.

This degree of versatility, coupled with the Canberra's proven performance and handling, and the possibility of operation from relatively small airfields, can hardly fail to interest overseas air forces as it has the R.A.F.

At last year's S.B.A.C. Display the prototype B.8 was "statically parked" with bombs (including 1,000 lb medium-case bomb and another 1,000-pounder designated "Mk 8"); with four 20 mm guns, each with a huge ammunition container holding something like 500 rounds; and an F.24 high-level camera.

Iraq Agreement and the R.A.F.

THE value of the new defence agreements with Iraq and Turkey as a foundation of a general defence organization in the Middle East was underlined by the Foreign Secretary, Sir Anthony Eden, in the House of Commons on March 30th. Summing up the contents of the agreement, he said with reference to Great Britain and Iraq that the central theme was that there should be close and continuous collaboration between the armed forces of the two countries. There would be joint planning and exercises, so that if ever there were aggression against Iraq we should be in an effective position to support her. We should advise and give technical assistance in establishing an air defence organization, including radar warning and an aircraft reporting system. Sir Anthony continued:—

"We shall be able to stock military stores and equipment in Iraq for use in war. . . . There will be British advisers and instructors to assist in the training of the Iraqi Army . . . and we may maintain our present facilities for over-flying, landing, and servicing our aircraft in Iraq.

"As part of these arrangements the airfields in Iraq, which are now occupied by the R.A.F. (under the 1932 treaty we have had air bases at Habbaniya and Shaiba), will pass under Iraqi control and the British squadrons now stationed there will be progressively withdrawn.

"But it is agreed that R.A.F. squadrons shall visit Iraq as part of the joint training process, and British Service personnel will remain in Iraq to service British aircraft, to install, operate, and maintain facilities and equipment, as well as to assist in the training of Iraqi forces. These men will be commanded by British officers acting in close liaison with the Iraqi officer in command of each establishment.

Malaya: An Australian Contribution

AUSTRALIA is to make a special contribution to the defence of Malaya by providing land, sea and air forces. This was announced on April 1st by the Prime Minister, Mr. Menzies, who said that the forces would not in themselves be massive: the Naval strength would consist of two destroyers or frigates and an aircraft carrier on an annual visit; the Army would contribute an infantry battalion, and the R.A.A.F. would provide a fighter wing of two squadrons and a bomber wing of one squadron. An airfield construction squadron would also be included. Australia already had an air unit in Malaya, added Mr. Menzies. (The aircraft carrier mentioned is likely to be H.M.A.S. *Sydney;* the new carrier, *Melbourne,* is not due to commission until October, and Mr. Menzies said that it is proposed to have the new forces in Malaya by July or August.)

The Prime Minister said that the "drastic truth" of the present situation was not "that we can defend Australia by force, or guns, or battalions around the shores of Australia, but that if there is to be a war for our existence, it should be carried on as far from our own soil as possible. It would be a sorry day for the security of Australia if we were driven to defend ourselves on our own soil."

Air Survey and Civilization

A REMARKABLY comprehensive review of the broader aspects of air survey formed the subject of an R.Ae.S. main lecture on Thursday of last week. The speaker was Mr. T. D. Weatherhead, O.B.E., M.A., who is director and general manager of Hunting Aerosurveys, Ltd., and the title of his paper was *The Application of Aerial Survey to the Economic Development of a Country.*

The first section of the paper was devoted to stating the problem, a complex one involving such factors as opposed political ideologies, the universal demand for an increased standard of living and

CONCENTRATED LOAD: A four-ton lithographic printing press recently flown from Cleveland, Ohio, to Montreal in a T.C.A. Bristol Freighter. It is thought to have been the heaviest single item of freight ever flown in Canada.

the rapidly increasing world population. From this Mr. Weatherhead went on to review remedies being applied by various organizations, international and national.

The first requirement for any development planning was a topographical map. In many countries mapping was the responsibility of Government survey departments, but often their usually limited staffs had to concentrate on the urgent requirements of property and special-project surveys. Also, until the advent of the aeroplane, it had been virtually impossible to tackle the problem of preparing accurate topographical maps of vast size. Quoting official figures, the lecturer showed that out of a total of 2,000,000 square miles in the British Colonial Empire only 300,000 had been mapped, and most of that area in the form of an uncontoured plot to a scale of 1/50,000. In many other countries the position was far worse.

From this point the lecturer went on to discuss the geological surveys and their value in increasing the world's resources. He cited typical major operations recently or currently in progress in many parts of the world, and concluded on a rather more technical note by giving a number of descriptions of electronic techniques of survey, three of which could be combined in one aircraft: the airborne magnetometer, the scintillation counter and the electro-magnetic detector. We hope to make further reference to Mr. Weatherhead's lecture in an early issue.

Mediterranean Air Power

SOME of the complexities of defence organization in the Mediterranean area were explained by Admiral the Earl Mountbatten when, on March 30th, he lectured before a distinguished assembly at the Royal United Service Institution in London. The paper bore the title *The Command of Allied Naval and Maritime Air Forces in the Mediterranean*, and Admiral of the Fleet, Sir Rhoderick McGrigor was in the chair.

Having described how possible divergencies among national interests had been catered for, Earl Moutbatten said that it only remained "to see to it that land-based as well as carrier-borne aviators also should be able to take care of the air point of view in a predominantly naval headquarters". In HAFMED (Headquarters of the Allied Forces, Mediterranean) there was, he said, at least one "light blue" air force officer from each of the six nations concerned as well as "dark blue" aviators from the U.S., French and Royal Navies. Moreover, there was at least one of these officers in every staff division, so that "the air point of view is fully integrated". The A.O.C. Malta, Air Marshal Reynolds, was Deputy CINCAFMED (Air) and held his own air meetings, attended by airmen from every division to ensure that air interests were adequately taken care of.

The organization of the maritime air forces in the Command had proved to be "rather uphill work." To begin with, the Greeks and the Turks had no maritime air forces, but were examining the question of naval/air co-operation by any of their air force squadrons which might be available. Next, the Italians had been given Harpoons by the U.S. Navy, who had also trained Italian naval officers to pilot them; but the question whether they should come under the Italian Air Force or Navy was still under discussion. The United States and French Navies owned their own maritime air squadrons, which remained under purely naval command. Finally, British aircraft not embarked in aircraft carriers belonged to the Royal Air Force, and command of ships and aircraft was exercised jointly by the Flag and Air Officers concerned, from a maritime headquarters. In Malta, Air Marshal Reynolds acted jointly with Vice-Admiral Reid in the command of the South-Eastern Mediterranean Area, while A. Cdre. Barrett acted with Rear-Admiral Currey in the Gibraltar Sub-Area.

In comparison with some of the difficulties which arose through naval and maritime air forces not being under unified command, it might seem that the American and French system, whereby the navies owned their own shore-based maritime air forces, would provide "an island of simplicity in a sea of complications." But their refusal (which in the American case was particularly emphatic) to place their aircraft under any but a purely naval command had made the situation more difficult.

A solution acceptable to all was not easy to work out; but when Earl Mountbatten left Malta in December, thinking was along the following lines: The French and Italian maritime air forces would work under their own area commanders, though the exact command relationship would ultimately depend on the final decision as to whether the Italians' maritime air force would belong to their Navy or to their Air Force. The British would continue to work under their own A.O.C.s at Malta and Gibraltar. The Americans would come under a functional naval air commander, known as COMUSPATMED, directly subordinate to CINCAFMED. They would operate, as required, to support any area, and would be prepared to send a liaison officer or delegated commander to the relevant area headquarters while operating there.

Later in his lecture, Earl Mountbatten referred to the difficulties in protecting convoys in the Mediterranean by shore-based fighters. This would, he said, be provided by aircraft carriers. "However," he went on, "I have no doubt that the Allied strategic air offensive against enemy airfields and bases, which would be largely carried out by the carriers of C-in-C. South's striking force, will whittle down very considerably the scale of air attack which we could otherwise expect. In fact, you must not think that, because I have dwelt on the defensive aspects of a possible war in the Mediterranean, the offensive aspects have been overlooked. But you will appreciate that for security reasons I cannot give you any details."

Hucknall Test Crash

WE regret to record the death of a Rolls-Royce test pilot, together with three technicians employed by the company, when a Lancaster aircraft used as a flying test-bed crashed on the company's airfield at Hucknall on March 29th.

The pilot was Bob Jones, 34 years old, who joined the company in 1951; he was a flight lieutenant in No. 616 (South Yorkshire) Fighter Squadron, R. Aux. A.F., and a holder of the D.S.O. The three technicians—who, with the pilot, were the sole occupants of the aircraft—were I. D. Davies (a flight observer and ex-R.A.F. pilot officer), William Orr and M. P. Costello. The Lancaster was powered by two gas turbines and two piston engines at the time of the accident.

Prestwick Accident Inquiry

A PUBLIC inquiry into the Christmas Day accident at Prestwick Airport, when a B.O.A.C. Stratocruiser caught fire on landing, with the loss of 28 lives, began at Ayr on March 28th. The proceedings are being conducted by Mr. C. W. G. Guest, with Capt. I. A. Grant and Capt. E. Avery as assessors.

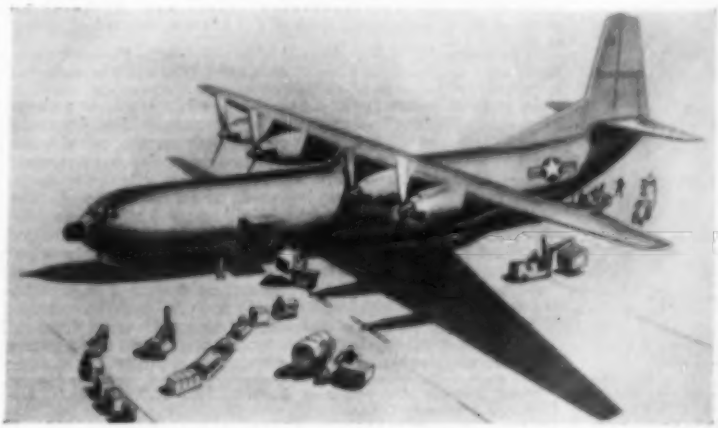
On the first day of the inquiry evidence was given that the aircraft struck the ground 42 yd short of the runway, bounced and burst into flames. On March 29th, the court listened to a recording of the G.C.A. talk-down given before the accident; the talk-down ended with the aircraft at a height of about 100ft and a distance of 400 yd from the runway.

Capt. W. L. Stewart, commander of the Stratocruiser, gave evidence on March 31st. He described the approach to Prestwick and stated that the aircraft "fell out of his hands" shortly before striking the ground; he thought that partial retraction of the flaps was the cause of this deviation from the intended flight-path. Earlier, evidence had been given that other Stratocruiser pilots had experienced inadvertent retraction of the flaps from the full 45 deg position, as a result of alleged malfunctioning of a spring-loaded selector switch. A modification to prevent slipping of this switch had been embodied in some B.O.A.C. Stratocruisers before December, 1954.

America's Exports

ACCORDING to figures published last week in *Planes*, the official journal of America's Aircraft Industries Association, United States aircraft manufacturers exported aircraft and parts worth $538,604,000 (£192,700,000) during the first ten months of 1954. Comparison is made with Britain's foreign-market sales of $156,940,904 (£56,050,000) during the entire year.

The article said United States sales representatives had to "go it alone" in overseas markets and "depended entirely on the



***LEVIATHAN**: The first picture to be published in this country of the Douglas YC-133 logistics transport, to be powered by four Pratt and Whitney T34 turboprops, of 5,700 e.s.h.p., to have a maximum speed of the order of 400 m.p.h., and a range of 6,200 miles, and to fly at a gross weight of over 396,000 lb. Payload is said to be 110,000 lb and cabin length about 90ft. The picture appeared in "Aireview," Japan.*

FROM ALL QUARTERS . . .

technological superiority of American-made products in selling their merchandise." On the other hand, it said, "British aircraft manufacturing salesmen are given full support by the British Diplomatic Corps, which actively promotes its country's aircraft products . . . The American aircraft industry salesmen need no crutch to sell their merchandise, but obviously they would appreciate—and welcome—a greater degree of interest on the part of our Government representatives at home and abroad."

Atomic Experiments Continue

THIS year's series of atomic test explosions in the Nevada desert is continuing, and a great deal of information is being sought about all manner of aspects of nuclear attack and defence. On March 29th, for the first time, two explosions were effected in one day, one at the top of a 500 ft-high tower and the other after "a device" had been dropped from a high-flying aircraft. The first was reported to equal 30,000 tons of T.N.T. in power—more powerful than the Hiroshima bomb of 1945. The second exploded at "above 15,000ft" and produced a pinkish cloud.

Some 67 major experiments were being carried out in connection with these explosions and 112 aircraft were flying in the area. A large quantity of military equipment of all types was exposed to blast and radiation and samples of the clouds were collected by the aircraft.

FLUORESCENT RED is the colour of the R.C.A.F.'s new target-towing Avro CF-100s, the colour being chosen to prevent any risk of aircraft and target being confused. The 6ft×30ft wire-and-nylon banner is linked to a radar reflector, seen in the foreground, for "collision-course" attacks by fighters with radar sighting.

PROFIT AND LOSS—OFFICIAL

AS briefly recorded last week, Sir Frank Tribe, the Auditor-General, has published* his report on the expenditure of sums granted by Parliament to the R.A.F. during the year ended March 31st, 1954. The thoroughness of the investigation must inspire in the reader an admiration only exceeded by his astonishment at the examples of ineptitude brought to light; and he is left with the hope (though on past experience perhaps not a very confident one) that the report's general note of disapproval—and records of sharp knuckle-raps administered to various ranks and grades—will have a beneficial effect in future years. Nevertheless, when the magnitude of the Service and its equipment is borne in mind, the number of instances of negligent wastage is probably not disproportionate.

A serious example reported concerns Air Ministry instructions given in 1951 to a "master" provisioning depot to dispose of certain aero engine spares classed as "repairable." In passing on these orders to six other depots the "master" failed to limit them to the "repairable" components; in consequence, all the depots took steps to dispose of their entire stocks of the spares, serviceable as well as repairable. The mistake was discovered in 1952 and the main depot then issued instructions to only four of the six other depots to retain all serviceable stocks and to recover any that had been awaiting auction. "No attempt appears to have been made by the 'master' depot to ensure that effect was given to these later instructions," says the report, "and it was not until November 1952, after another inquiry on the stock position, that action for recovery of the spares was energetically pursued." Sir Frank Tribe continues:—

"One of the depots, to which the revised instructions of March 1952 were not sent, sold in June 1952, for £10, stocks to the value of £15,900. Other depots failed to take effective action on the revised instructions. At the 'master' depot a search was made for serviceable spares, but this was given up before any were found, although it was apparently not till May 1952 that some of the stores (valued at £49,500) were sold. At two depots no search was apparently made for the spares; at one of them, stock to the value of £71,400 was disposed of, mainly as scrap. . . ."

"The serviceable spares disposed of in error realized about £2,650. Some were later recovered for about £1,000. The value of those not recovered is of the order of £135,000."

In another instance, two engines arrived in crates at a depot in August 1951. The cases were "apparently thought to be empty" (!), and were sent for storage. When the mistake was realized a search was made, but only one of the engines came to light. The other could not be traced, "and it is thought that the case containing it may have been sold as an empty case." The matter was not reported to the Ministry until November 1953 and "the Ministry expressed their grave concern at the delay." No mention is made of any official concern being expressed at the consequent loss of £689—a sum which, we are told, was "written off by the Ministry under their delegated powers."

Storage-depot stocktaking methods are criticized, an example being quoted of a reported deficiency of several hundred thousand examples of a certain small part; investigations into this startling loss eventually revealed that the vocabulary (stock-list) number had somehow become confused with the quantity in stock during a previous stocktaking, with the result that a considerable "surplus" had been created—and later, not surprisingly, reported as missing.

Service leave arrangements have already, it appears, received a considerable shake-up as a result of Sir Frank's investigations. His department took a test sample of a hundred airmen, and it was found that eleven of them had received more leave than they were entitled to; what interested the Auditor-General, however, was that they had also received ration allowances, at the taxpayer's expense, for the extra period involved. When the matter was brought to the attention of the R.A.F. they conducted their own investigation, using a sample of 2,700 men. This test supported the Auditor-General's findings—"in eleven-and-a-half per cent of the cases, excessive leave had been granted to an average extent of over five days."

Accidents and fires were responsible for a number of losses; for instance, the East Coast floods in the winter of 1953 caused loss of stores and damage to buildings amounting to £83,276. In another case, radar equipment valued at £2,769 was destroyed in a fire caused by overheating of a transformer. Here there is the somewhat touching comment that "disciplinary action, including a penal deduction of £3, was taken against three airmen."

Not everything in the report is a tale of debit. Under the heading of "Vote 7, Aircraft and Stores," for instance, there is a surplus of £23,554,802 for aircraft, with the comment, "due mainly to revision of programmes, production difficulties and an over-estimate of redundancy payments, partly offset by price variations." Comparable savings, for similar reasons, are shown in the case of a number of items of equipment. There was also a surplus of £9,004,038 under the heading of "liquid fuel, lubricants, etc"; this is explained as being due mainly to retention in use of a non-dutiable grade of aviation fuel, and to a general decrease in prices.

For those who demand "human interest," even in official White Papers, there is this explanation of a cash loss of £923: "Over-issue of marriage allowance amounting to £1,223, to a woman who bigamously married an airman. Recovery of £300 is being effected from the airman."

*"*Air Services Appropriation Account, 1953-54.*" Price 2s, Her Majesty's Stationery Office.*

D.H.53 DRAWINGS WANTED

THE Shuttleworth Trust has recently acquired a de Havilland D.H.53 Humming Bird low-wing monoplane, which is now being restored by the de Havilland Aeronautical Technical School and the de Havilland Service Department. (The D.H. 53 was originally designed for the lightplane trials at Lympne in 1923, and a number were built for civilian use, together with some for the R.A.F.) It appears that very few detail drawings of the aircraft are available, but it is known that a complete set existed as recently as 1949; at one time they were in the possession of the College of Aeronautical Engineering, Chelsea. The D.H. School would very much like to know whether any *Flight* reader is aware of their present whereabouts; information should be addressed to Mr. E. J. Mann, The de Havilland Aeronautical Technical School, Astwick Manor, Hatfield, Herts.

THE SPEED OF THE FOX

A Fairey Occasion with Historic Associations

REFERENCE was made last week to a recent luncheon at Claridges Hotel, London, at which the directors of the Fairey Aviation Company presented a handsome silver model of the Fox to No. 12 Squadron of the Royal Air Force. Sir Richard Fairey was present personally to propose the toast and hand the model to S/L. F. C. D. Wright, D.F.C., the C.O. of No. 12.

In his speech, Sir Richard spoke of the development of high-speed aircraft 30 years ago, and the part played by No. 12 Squadron and the Fox, the fastest bomber of its time. (Below we append some notes on this remarkable aeroplane and include a number of the points to which Sir Richard referred.) When work started, Sir Richard revealed, there was no more than £7,000 in the Fairey kitty. This increased over a period to £23,000, but by the time the Fox had made good its promise—and, with increased wing area, had flown at 156 m.p.h.—all had gone. It was then that Lord Trenchard came to the rescue with a contract [as outlined below].

The presentation of the silver model was to commemorate the achievement of the Fox. Sir Richard said that only the squadrons could develop the utility of an aeroplane.

Everyone was delighted that Lord Trenchard was able to be present at this luncheon to confirm Sir Richard's narrative. The test pilot, Capt. Norman Macmillan, was also a guest.

Replying, S/L. Wright said that it was in 1925 that the Fox appeared at Andover where No. 12 Squadron was stationed. In its later version with a different make of engine it was, he believed, capable of 220 m.p.h.; so the bomber was faster than the fighter. Today there had been a full swing of the pendulum and 12 Squadron's Canberras could often walk away from the fighters they encountered.

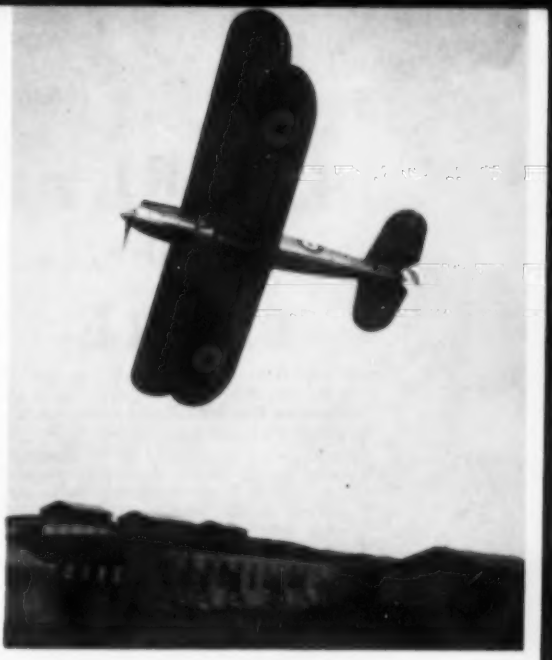
S/L. Wright next referred to the incorporation of a Fox *motif* on the squadron Standard, and more recently, to the appearance of both Fox and Standard in Grimsby town hall. The squadron's motto "Leads the Field" stemmed directly from Fox days.

The health of the guests was most competently proposed by Mr. R. T. Outen, deputy chairman of Faireys, and Air Marshal Sir George Mills, C-in-C. Bomber Command, replied.

Like Sir John Baker, the V.C.A.S., who was also present, Sir George is a former member of No. 12 Squadron—the adjutant, in fact, when the Fox was introduced. He recalled a further virtue of the Fox. Having remarked that it was a nice aeroplane to fly, and gave no trouble, he said that if the undercarriage happened to collapse, there were no bits of aircraft to stick into one, because the Fairey-Reed metal blade doubled up underneath and formed a nice skid. After further reminiscences, Sir George concluded by saying that the silver model of the Fox had been placed in good hands. As with any other aircraft, he knew it would be used to advantage and looked after well by No. 12 Squadron.

Historical Notes on the Fairey Fox.—Having seen Lt. David Rittenhouse, U.S. Navy, win the 1923 Schneider Trophy Race in a Curtiss CR-2 seaplane at a speed of 177.38 m.p.h., Mr. C. R. Fairey was much impressed by the design of both the airframe and the liquid-cooled engine. Early in the following year he visited the U.S.A. and secured the British rights for the engine (the famous "D.12"), and for the Curtiss wing radiator, Curtiss-Reed metal airscrew, and high-efficiency wing sections. Wedding to these a single-bay biplane airframe of extreme cleanness, his company produced, early in 1926, the Fox two-seater day bomber, a machine of composite wood and metal construction, carrying two 230 lb or four 112 lb bombs at a speed of some 150 m.p.h. at 10,000ft. All-up weight was 4,117 lb and service ceiling 19,350ft, which height was attained in about 40 minutes.

Capt. Norman Macmillan, who tested the prototype, has related how the Chief of the Air Staff, now Marshal of the Royal Air Force Lord Trenchard, came to witness a demonstration at Andover, following which he walked with Macmillan out on to the grass airfield and asked "many searching questions." The answers were such that he returned to the tarmac and told Mr. Fairey that he had decided to order enough Foxes to equip a squadron. The chosen unit was No. 12 (Bombing) Squadron, based at Andover, and in subsequent air exercises the 12-Squadron Foxes repeatedly eluded the opposing fighters. Eventually a few Foxes were re-engined with the Rolls-Royce "F" engine (later to be known as the Kestrel), but this version is not to be confused with the Fox Mk II, an all-metal machine of wholly new design which was in later years to be the subject of important contracts for the Belgian Government. With a supercharged Kestrel (the D.12 in the original Fox was normally aspirated), the Fox II achieved about 190 m.p.h. A later variant had the French Hispano-Suiza 12Ybrs of some 860 h.p., and it was this which attained 220 m.p.h. and which S/L. Wright probably had in mind. The Hispano-Fox was developed by Avions Fairey, the managing director of which, Mr. E. O. Tips, flew as test-observer in the original Fox.



This fine action study of the Fox was taken by "Flight" during one of Capt. Norman Macmillan's demonstrations at Northolt. Below is seen the handsome silver model, by Skinner and Company, presented to No. 12 Squadron.

Sir Richard Fairey presents a silver Fox to S/L. F. C. D. Wright, commanding No. 12 Squadron at a commemorative luncheon in London.

HERE AND THERE

FORTY-NINER IN FIFTY-FIVE: The Bell 47G which, as mentioned in a paragraph below, has been equipped for uranium prospecting. A portable drill is carried on the wire rack over the port undercarriage; geological survey instruments include a scintillometer.

Mystères for Israel

FIFTEEN Marcel Dassault Mystère II jet fighters have been ordered by the Government of Israel. In the absence of further information it is presumed that these are powered, as are Mystère IICs for the French Air Force, with SNECMA Atar 101s.

New Arctic Route

CARRYING a crew of seven and eight supernumeraries or technicians, a DC-4 of Canadian Pacific Airlines will set off from Vancouver on April 9th for a five-day familiarization flight over the company's new Arctic route to Schiphol. Scheduled services, to be flown with DC-6Bs, are now expected to begin in June.

For Service in Kenya

AWARDS have been made to several members of the R.A.F. for their part in air and ground operations against Mau Mau terrorists. Among those honoured are two pilots who figured in *Flight's* first-hand account of air operations in Kenya, published on November 12th last: S/L. (now W/C.) C. G. St. D. Jeffries receives a second bar to his D.F.C., and F/O. (now F/L.) M. R. Holmes, a mention in dispatches. The first part of the awards list appears on pages 467-8 of this issue.

Second Production Beverley

CONGRATULATIONS are in order to Blackburn and General Aircraft, Ltd., on flying the second Beverley of their production order for R.A.F. Transport Command on the evening of March 30th—sixty days after the flight of the first machine "off the line." The pilot was Tim Wood. Incidentally, the company's founder, Mr. Robert Blackburn, had celebrated his 70th birthday four days before; unhappily, a sudden illness confined him to bed, but he has since, we learn, been making good progress.

Yeovil Birthday

FORTY years of aircraft manufacture are being celebrated by Westland Aircraft, Ltd., and to mark the occasion *Flight* next week will be publishing a special feature dealing with the many notable aircraft produced by the company. Another article will be contributed by Mr. Harald Penrose, the chief test pilot, who joined the company in 1925.

Prospecting by Helicopter

THE Bell Aircraft Corporation has established a subsidiary to pioneer the use of the Model 47G helicopter as a multi-purpose vehicle for uranium exploration and survey work. Called the Bell Exploration and Development Corporation, the new concern has equipped a 47G for a tour of the mineral-rich regions of North America. Equipment includes a scintillometer—an instrument which, sensitive to gamma rays, can detect uranium deposits. A diamond core-drill weighing some 300 lb is carried and, after the helicopter has alighted at a chosen spot (even on rocks, snow or mud), is unloaded and set up; the drill is capable of sinking a hole 300ft deep. Having obtained core samples, the helicopter can deliver them speedily for analysis.

B.O.A.C. Super Connie Services

SUPER Constellation tourist services, at a frequency of ten round trips weekly, were introduced by B.O.A.C. on their New York to Bermuda run on April 1st. The aircraft used are two L.1049Ds leased from Seaboard and Western Airlines and modified to carry 87 passengers; they are flown by Seaboard crews but carry B.O.A.C. cabin attendants.

"Dam-Busters" Film Première

THE Pathfinder Association has been asked to organize a world première, for charity, of the film *The Dam-Busters*. The première is expected to be held in the West End of London on the 12th anniversary of the famous raid on the Möhne, Eder and Sorpe dams, which took place on May 16th, 1943.

"Fatigue" at Oxford

ON Friday, April 15th, the Oxford local section of the Institute of Metals is holding a meeting (in collaboration with the Institute's Metal Physics Committee) on the subject of *Fatigue*. The meeting, which is open to non-members without ticket, will be in the lecture theatre of the Clarendon Laboratory, Parks Road, Oxford.

For Higher Production

WORKS managers and others interested in the latest mechanical handling equipment may like to know that a 16mm colour sound film on this subject is available on free loan from *Mechanical Handling*, the journal which organizes the biennial Mechanical Handling Exhibition and Convention. Applications should be made to H. A. Collman, *Mechanical Handling*, Dorset House, Stamford Street, London, S.E.1.

A.P.U. Reliability

THE U.S.A.F. has increased the approved overhaul period for Solar Mars gas turbine auxiliary power units from 500 to 750 hours. As already recorded in these pages, the first Mars airborne A.P.U. last year completed 500 hr of service in a C-124C Globemaster, with only routine maintenance. Further units installed in other aircraft have now logged more than 40,000 hr. As announced in our issue of March 18th, Mars are now being made under licence in Great Britain.

WICKET GATE: This Fairchild C-119 Flying Boxcar is being used to test a new flight-opening cargo door, as shown. The bottom of the door, and the door itself, both hinge upward for heavy dropping; previously the whole door assembly had to be left on the ground.

JODEL D.112 and DRUINE TURBI

Two French Ultra-light Two-seaters Compared

IN the active French ultra-light aircraft movement there are now several trends emerging from the activities of the amateur constructors and small aircraft manufacturers. Types may be roughly divided into four categories:—

(1) The ultra-light single-seater of about 30 b.h.p.

(2) The easy-to-build two-seater of between 50 and 75 b.h.p.

(3) The side-by-side cabin two-seater of 65 b.h.p. (requiring more involved procedures in construction than those usually available to amateurs).

(4) Extrapolated versions of the types in (3), usually using 90 b.h.p. and built in factories.

The majority in use fall into the second category, by far the greatest number of these being Jodel D.112 two-seaters. Others in this class include the Roger Adam 14, Boisavia Chablis, Brochet, and Druine Turbi.

Following the recently announced delegation to the British Popular Flying Association of airworthiness investigations for ultra-light aircraft, this body has taken the initiative in importing two French designs for the benefit of its members. The first of these is the Druine Turbulent, for the single-seat enthusiast, and the second is the Druine Turbi for groups wishing to construct a simple two-seater of low first cost. Examples of both these types are under construction from plans, complete with translations, issued by the Association. This step has formed a basis for what could become a rebirth of light-aircraft flying in this country.

The Jodel has been widely built as a cheap cabin monoplane while the Turbi was the alternative formula of a tandem open two-seater (although a hooded version is available). These two aircraft provide an interesting comparison of two ways of meeting virtually the same problem, that of simplicity and low cost.

The Jodel D.112 is a logical two-seater development of the well-known little single-seater Bébé Jodel with its Volkswagen car engine, a tremendous number (over 200) having been built of both types. The two-seater is the work of MM. Joly and Delmontez of Beaune who have, throughout the design, had one idea only—a simple aircraft of reasonable performance and without frills and gadgets. Naturally this idea does not result in such an attractive aeroplane as, say, a factory-made Supercub with radio and a retractable undercarriage, but for the organization with little funds it gets members airborne at a reasonable cost.

Of the many Jodels seen in France, both complete and partly constructed, probably the fairest picture can be obtained from an example which is in constant club use by a variety of pilots, and was constructed in a normal club workshop under the supervision of the club mechanic. Such an example was provided for the purpose of this article by the Aero Club d'Auvergne at Clermont Ferrand, who had another almost completed in their hangar while four more were parked on the airfield. Two of these latter, in particular, were superbly finished, with paintwork and cabin appointments equal to those of a high-class motor car.

Structurally the two-seater Jodel follows the lines of the previous Bébé Jodel. The fuselage is a square box of classic longeron-and-ply-skin construction with provision for side by side seating, the cabin being enclosed by a simple canopy structure hinged fore and aft along the top centre-line. The fuselage sits on the one piece mainplane which is of single-spar construction, the spar being a substantial torsion box wider than its depth and with the outboard sections sharply turned up to give the tip panels (which carry the unbalanced ailerons) a steep dihedral angle. The undercarriage legs are single shock-strut structures using rubber in compression. These are bolted to the front face of the spar and carry low-pressure wheels, with brakes as an optional fitting.

The aerodynamically balanced rudder is the sole vertical surface, there being no fin at all. Tailplane and elevators are conventional and square-cut structures, mounted on the top longeron and carrying a trimming tab on the trailing edge of the starboard elevator. Control gaps are sealed with fabric.

The engine installation is normally a Continental A65 similar to that in the Piper J3c Cub, and is mounted on a triangulated-steel-tube bearer structure which is very simple, but could be criticized for the detail of its attachment to the bulkhead. Other engines can also be fitted, and almost any well-known unit in the 45-70 b.h.p. bracket is suitable. Fuel is carried in a tank mounted in front of the pilots' cabin, and the tank is fitted with simple, accurate and reliable cork-and-wire gauge.

Access to the cabin is by means of a footwalk on the top skin of the mainplane adjacent to the fuselage, entry being extremely easy, the canopy top folding well clear. When one is seated in the cabin it is obvious that the designer is of ample proportions in that he has made provision for two full-sized occupants. The control columns are straightforward tubes, mounted on a rocking shaft laying transversely in the cabin and connected to a fore-and-aft torque-tube which works the aileron controls. This system gives a slightly peculiar feel to the stick when moving it from side to side, but the strangeness soon disappears. Steel tube rudder-pedals are fitted, the cables running fore and aft along the centre-line of the fuselage.

A range of instruments to suit the owner is fitted on a simple oblong aluminium panel which has a vertical quadrant at each end. The quadrants are a feature peculiar to this type in that they house two levers rather like the seat-adjusters on some cars, movement upwards opening the throttle and movement downwards closing it. This vertical movement seems odd at first, but causes no difficulty and after a time comes naturally. Carburettor heat and cabin-heat controls are fitted side by side, an arrangement personally disliked—how many people have stopped a Continental with icing after pulling the cabin heat by mistake? Although simple enough, the cabin is comfortable, with everything easily to hand with the exception of the trimmer. This is a push-pull control mounted on the seat back between the occupants where it has to be groped for, and it also works in the wrong sense. On this particular aircraft it did not give a sufficient range for normal flight conditions.

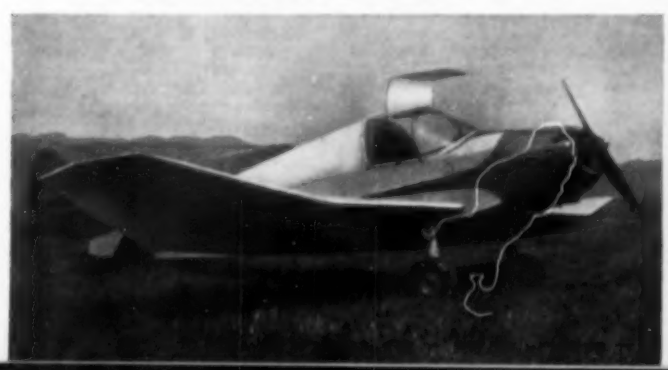
The view forward is exceptionally good through the one-piece windscreen, which is a simple shape developed from the flat without moulding. The whole canopy is framed with small-diameter steel tube at its boundaries giving a moderately stiff structure, but the locks, while simple, are somewhat country-style and could be easily knocked open in flight. A simple ventilator is fitted, but there is no provision for a sliding window or direct-vision panel for bad-weather flight. Such a panel, in the writer's opinion, is essential.

So much for the general features of the aircraft, which may be summed up as being attractively simple.

The Druine Turbi.—Similar remarks apply to the construction of the Turbi, and it would be difficult to say which is the simpler of the two to build. Probably on balance the Turbi is simpler in that its wing structure is parallel and straight, compared with the cranked and partly tapered Jodel wing. Against this, the Turbi constructor has to make leading-edge slots.

In the Turbi the designer, Roger Druine, has had particularly in mind a school aircraft suitable for training young pilots as well

The side-by-side two-seater Jodel D.112, illustrated here, has been built in numbers and is well-liked by club pilots. It is as simple as possible, and yet offers flying characteristics and comfort equal to those of many larger aircraft.



JODEL D.112 AND DRUINE TURBI . . .

as for cross-country sporting flying. As might be expected, M. Druine's experience as a flying instructor has shown up in many practical ways.

At the time of the construction of the prototype Turbi there was an official move afoot in France to encourage the Beaussier engine, which is made mostly from Citroen car-engine parts, and as a result this engine was fitted to the Turbi. Alternative engines with more power include the Walter Mikron and Continental A65, with which the aircraft performance is greatly enhanced. The general lines follow those of the Turbulent single-seater, and it is equally intended for simple construction by amateurs. In view of the present U.K. interest in the type it is described in some detail.

The mainplane is a rectangular cantilever structure with rounded tips, and leading-edge letter-box slots fitted over nearly fifty per cent of the span. It is constructed entirely of wood and is a two-spar structure, the main spar being located at 25 per cent chord and the auxiliary spar at 62.3 per cent. The main spar is of box type with laminated booms and ply webs. The I-section rear spar locates the trailing portion of the ribs, as well as supporting the ailerons. The trellis-type ribs are all made in the same jig and are in two pieces, one located in front of the main spar and the other aft. Although there is not much torsion using the N.A.C.A.23012 aerofoil section, the leading edge is covered with ply, making a substantial torsion box. The slotted ailerons are supported on two inset hinges, one of which forms part of the actuating control. Except for the ply leading-edges they are covered with doped fabric.

Seating is arranged in tandem, the cockpit width being approximately two feet. Two slab sides, a flat bottom skin and a curved top decking form the fuselage shape, the rear decking being fabric-covered for lightness. A substantial main bulkhead locates the wing attachment while an equally substantial front bulkhead supports the engine mounting structure.

The tail unit has a simple non-adjustable tailplane which is ply-covered, while the elevators are of similar construction to the ailerons and rudder. The elevators are cable-operated to the centre hinge fitting and a trimming tab is operated by a Bowden-type control operated from a knob on the throttle box. The fin is built integrally with the fuselage and has a ply covering, a dorsal fin fairing being added after the tailplane assembly.

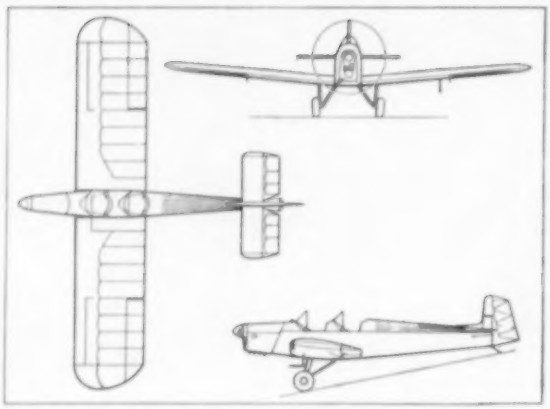
Two articulated vee structures with spring shock-absorbers in the main struts form the undercarriage, which is fitted with 15-inch diameter wheels, without brakes, in the standard form.

The dual control-columns operate on a common torque-tube located in the fuselage and running fore and aft. Control runs are of flexible cable except those for the rudder, which are of piano wire. Engine, fuel-cock and trimmer controls are fitted in light-alloy hand boxes on the port side of each cockpit, interconnection between cockpits being by means of dural tubes. The trimmer transmission is by a piano wire running in a conduit. A simple stop fitted in the boxes prevents the throttle being opened with the fuel turned off.

The engine fitted to the aircraft examined was manufactured by Moteurs Beaussier of Montlucon, Allier. It is an inverted four-cylinder air-cooled unit giving some 50 b.h.p. at take-off. Maximum r.p.m. are 2,800 while maximum continuous cruising is at 2,375 r.p.m. for an output of 35 b.h.p. Normal cruising is at 2,300 r.p.m. The airscrew, a fixed-pitch Merville 865 type of 5ft 3in diameter turns at crankshaft speed, while fuel is consumed at the reasonable rate of 2½ gall/hr.

Two arms, supported on each side by two struts, form the engine mounting which is of tubular construction, four rubber blocks being fitted to absorb the vibration. The engine is faired in a tipsy-style aluminium cowling with a nose cowl, top and bottom panels and side panels held by quick-release fasteners. The airscrew is fitted with a large spinner. Fuel supply is from a tank inside the front top decking while oil is carried in a simple

The smooth lines of the Turbi give a false impression of its size. It is in fact rather smaller than it appears to be.



The Druine Turbi open two-seater which has been approved for amateur construction in Britain. Work on this country's first Turbi was started recently by a Popular Flying Group at Hatfield.

tank on the forward face of the fire-proof bulkhead. For barographs, valises and other small impedimenta there is a small locker provided behind the rear cockpit. As with all French aircraft holding normal-category Certificates of Airworthiness, there is a fire extinguisher fitted under the engine cowling with a control and warning disc in the cockpit.

In designing the Turbi there has been no wish to produce an aircraft of extraordinary performance. The one hope has been to produce an easily constructed two-seater to be made from plans. For construction no expensive equipment or workshop processes are necessary. The one-piece spar with its laminations is assembled on a flat bench about 30ft long, the use of two straight planks enabling the laminations to be glued up simply, and the wing assembly is carried out on three trestles. The total sum spent on such equipment for the prototype cost only ten pounds and all this was not lost, the planks and trestles not being consumable.

The two fuselage-sides are made on the same layout and assembled inverted, like a model aircraft, with the main bulkheads and fin-post. The detail assembly follows, after which the front and rear decks are fitted.

The tail-unit ribs are some of the simplest items in the structure, being simple shapes cut from the flat, this method being quicker than building up with strips and ply, and carrying little weight-penalty. All structural materials are easily obtained; spruce for main members, birch or gaboon ply for skins and mild steel for fittings.

Flying Impressions.—Both the Jodel and the Turbi are popular with amateur pilots for their simple flying and economy of operation. Both fly pleasantly but a detailed comparison between the two is not truly representative due to the difference in power between the two examples tested. The Jodel with its Continental undoubtedly has a better performance than the lower-powered Turbi but, in handling, the Turbi seems to have an edge on the Jodel.

Both are very simple to taxi and the Jodel has an almost tricycle-aircraft view forward.

During take-off the Jodel requires less rudder to hold it straight than its single-seat ancestor, and with barely any lifting of the tail it flies off cleanly at an apparently flattish angle, giving a good view on the climb. The climb was as claimed with two up, while solo it was good and not of the tottering variety so often associated with low-powered aeroplanes. Clermont Ferrand is 300-odd metres above sea level and in a temperature of 23 deg C the initial rate of climb was of the order of 200 ft/min. The recommended climbing speed was given as 80 km/hr (50 m.p.h.), and in this condition it is barely possible to trim to check climb stability.

Longitudinally, the stability was marginal on the climb, the pitching resulting from a rearwards displacement of the stick damping out straightway with a return to virtually the original speed, while a forwards displacement resulted in the nose slowly going downwards until brought back manually from a steep nose-down attitude. This behaviour was undoubtedly in part due to the marginal trim in this condition. Laterally the stability check gave positive results from lowering the starboard wing but, with the port wing down, the aircraft left free went into a descending turn to the left. On a directional check the yawing either way corrected itself, due to the rudder having a spring centring device.

Level flight gave similar results, while a rate-of-roll check was

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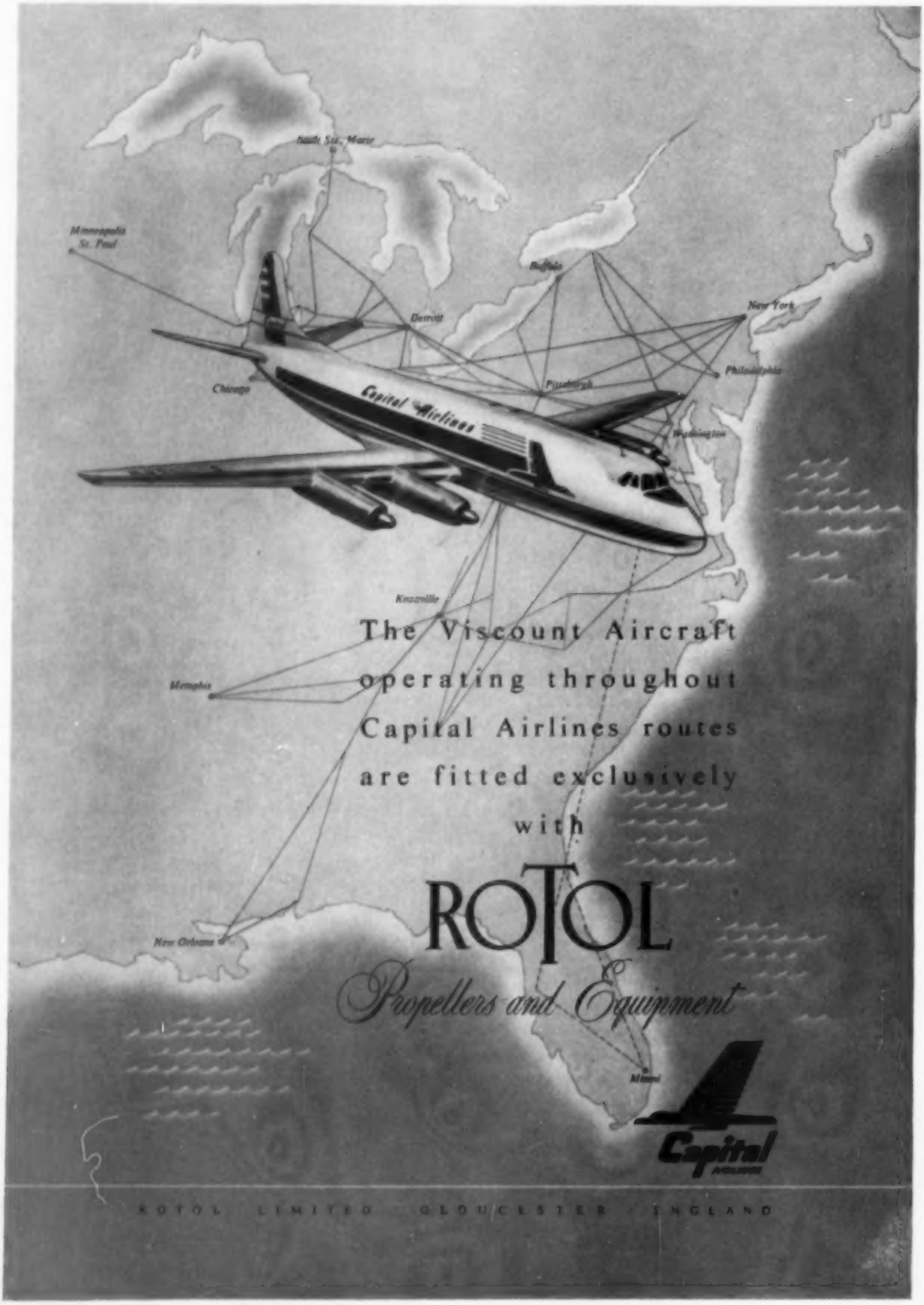
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JODEL D.112 AND DRUINE TURBI . . .

satisfactory. Normal manœuvres were straightforward in level flight at cruising speed (A.S.I. reading 120 km/hr, or 74 m.p.h.) and also at 1.3 times the indicated stalling speed of 60 km/hr (37 m.p.h.). In a straight stall, the nose had to be held high to make a break, after which the nose fell cleanly and moderately steeply with about 5 to 8 degrees of port wing drop, the loss of height being very small.

Sideslips to right and left at 1.3 times stalling speed resulted in heavy stick loads while the rudder lightened considerably. The maximum bank for a straight sideslip was reached before maximum rudder-travel. The rudder lightness, coupled with the tendency to wander in the somewhat bumpy conditions, engendered some suspicion of directional instability, but this could not be checked without disconnecting the spring centering device.

A check of the aircraft's behaviour in a simulated balked landing resulted in a satisfactory transition from gliding to climbing flight without longitudinal trim changes, and with little correction required directionally. Normal gliding at about 80 km/hr results in a flat glide with an excellent view—except of course immediately below. With this flattish glide one could feel that sideslip characteristics might be a little better, when considering the possible forced landing condition. The landing itself, however, is simple enough with a light and effective elevator, and an exceedingly short run without use of brakes.

Naturally there will always be a certain attraction in flying an open aircraft and the use made of the Turbi at Toussus le Noble certainly supports that contention. On my arrival at the Aero-Club de Canton de Sceaux the Turbi was in use, and immediately after I had flown it there was an eager member waiting to carry on with the day's programme.

The Turbi is normally flown solo from the rear cockpit, which is of ample width. The seat is a shaped plywood base similar to those of some sailplanes, and also having provision for a back-type parachute. One snag in the rear cockpit is that the rudder pedals allow the feet to foul the seat in front if the pilot is wearing heavy shoes. The windscreen is of sufficient size for comfort, and a helmet is not really needed. The Beaussier engine runs smoothly and quietly, is very responsive to throttle, and seems altogether very suitable for aircraft use.

Take-off is not exactly brisk with two up but, considering the low power of the particular engine, is certainly not worse than one would expect. The run required is about 160 yards to unstick and the subsequent climb is about 400 feet per minute. Naturally the extra fifteen b.h.p. provided by the Continental or Walter Mikron engines fitted in other versions improves this situation. The aircraft tested flew pleasantly and the controls were adequately responsive. At a reasonable height some straight stalls were tried and, using the method of slowly reducing speed at 1 m.p.h. per sec, the power-off stall was gentle and clean with a straight nose-drop. Holding the stick fully back at the stall resulted in no inclination to spin. There was no stall-warning except with power on, when the fabric on the top surface of the inboard portions of the wing vibrates visibly. Aileron control stays all the way due to the built-in slots. The stalling speed is ridiculously low and the A.S.I. is right off the clock.

A series of sideslips at varying speeds were straightforward and easy, the release of either or both controls resulting in a small straightening-up and a downwards pitching of the nose. Increasing speed to about 100 m.p.h. made the aircraft steady-up considerably, the controls becoming noticeably heavier (the elevator being very powerful) with short-period oscillations in the dive damped out quickly. Short-period oscillations in other conditions of flight gave satisfactory results, although on the climb the lateral stability seemed to be marginal. Ability to pitch the nose at low speed was adequate in a simulated engine-failure, while a balked landing showed no great trim-changes.

The landing is simple, although the elevator control needs to be used precisely enough to form a good exercise. The glide is at about 45 m.p.h. and can be steepened adequately by side-slips. In this respect the Turbi seems to have better characteristics than the Jodel.

Following these somewhat staidly conducted tests, Colonel Froidefond, the C.F.I. of the club, decided that a "presentation" as he terms it, should be given. In his expert hands the Turbi was thrown around the Toussus circuit with superlative skill, and at times about 30 extra b.h.p. seemed hidden under the cowling. The aircraft is not cleared for aerobatics but several "abrupt changes of attitude" were involved which showed the aircraft to be very controllable in recovery from odd attitudes.

The impression gained from flying both these types was that they were very pleasant little aircraft which, if used in the spirit of their designs, have a definite place in the French light aircraft movement.

H. B-D.

LEADING DATA

(Manufacturers' figures)

	Jodel D.112	D.5 Turbi
Span	27.0ft	28.75ft
Length	20.3ft	22.5ft
Wing area	134 sq ft	139 sq ft
Weight empty	594 lb	610 lb
Total weight	1,100 lb	1,090 lb
Maximum speed	112 m.p.h.	96 m.p.h.
Cruising speed	94 m.p.h.	74 m.p.h.
Stalling speed	38 m.p.h.	33 m.p.h.
Rate of climb	585ft/min	480ft/min.
Take-off run	125 yd	175 yd
Range	290 miles	400 miles

"WATER-BOMBING" FOREST FIRES

EVERY year thousands of acres of valuable Canadian timber are destroyed by bush-fires resulting either from natural causes or from the carelessness of campers and hunters. In their efforts to curb this vast annual waste, the Ontario Department of Lands and Forests have become more and more air-minded, and recently they have been experimenting with a "water-bomb" idea of fire-control.

The Department operates a number of D.H.C. Beavers. Normally used for fire-spotting patrols and communications duties, they have been found to be ideal for this new method of fire-fighting.

Now, when the air patrol observes a fire, it will drop water-bombs on the fringes of the blaze, to retard its spread until a team of ground fire-fighters can reach the spot. Occasionally the bombing is repeated, with the men on the ground directing the aircraft by radio.

During the summer months, when the danger of fires is at its peak, all aircraft operated by the Department carry a special kit of water-bombing equipment. This kit normally consists of a small roller conveyor, a water pail and several large empty bags. These bags are constructed of two layers of Kraft paper with a coat of latex in between. When it has been filled with water, each bag is sealed: a wax paper strip round the inside of the mouth is removed uncovering a coating of latex, which seals the bag when the mouth is pressed shut. The bag holds three-and-a-half gallons of water and weighs 35½ lb when filled.

If a fire is spotted, the pilot lands his aircraft at the nearest source of water. As most of the Beavers are fitted with floats during the summer months, this source of water is usually the nearest lake or river, never very far away in Ontario's northland. With the aid of the pail, from 17 to 24 bags are filled, depending on the load capacity available. The aircraft then takes off and returns to the scene of the fire.

Bombing runs are usually carried out at a height of not more than 200ft above tree-top level. Flaps are lowered and air-speed reduced to about 80 m.p.h.

The "bomb-aimer," at the pilot's word, thrusts the bags on to a short inclined roller conveyor which leads them rapidly down and out through the camera hole in the floor of the aircraft. Usually about eight bombs can be dropped in one stick.

Recently, too, experiments have been made with a helicopter carrying its own water supply, pump and length of hose.

B.E.A. AND COWARD

IT is very pleasant to find an adventurous spirit in an amateur dramatic company, and such a spirit seems to animate the B.E.A. Drama Group. For their second production—at the French Institute, South Kensington, on March 22nd and 23rd—they chose three out of Noel Coward's cycle of plays known as *Tonight at 8.30*. These were *Hands Across the Sea*, *Still Life* (from which was made the admirable film *Brief Encounter*), and *Ways and Means*, all three requiring considerable *panache* in production.

In the presence, on the opening night, of Mr. Peter Masefield, chief executive of B.E.A., and on the second, of the Mayor of Kensington (Lady Petrie), the audience were presented with a remarkably satisfying entertainment. The first play was produced by Denis Carew, who later took a principal part in *Still Life*: he carried out these different tasks most ably. Patricia Robertson-Kellie was notable in appearances in all three plays, but particularly so as a scatterbrained young hostess who mistakes the identity of some Colonially provincial guests in *Hands Across the Sea*, a slender study of "society" in the 1930s, which, however, dates rather less than *Ways and Means*. This last is full of brittle Coward dialogue.

Little need be said of the haunting *Still Life* (produced by Reginald Woodley) save that both Denis Carew and Dorothy Stokes stood up well to the inevitable comparison with Trevor Howard and Celia Johnson in the film. They were efficiently supported by Bob Fletcher and Audrey Bentley. *Ways and Means* was produced by Gil Burt.

P. P.

LONDON AIRPORT

THE two buildings in the London Airport central terminal area which are to come into use on April 17th are the control tower and the short-haul passenger-handling building. The design of both these buildings has already been described in *Flight* (September 25th, 1953, and January 21st, 1955); on these pages appear photographs of the passenger-handling block. The facilities of the control tower are the subject of an illustrated technical description on page 464.

The passenger building will deal with four classes of air travellers: (1) Terminal passengers, beginning or ending their journeys at London on overseas routes subject to customs, health and immigration clearances. (2) Transit passengers, travelling on the same service from one country to another *via* London Airport, and not subject to customs, health and immigration formalities. (3) Interline passengers, changing from one service to another at London Airport. These require customs, etc.,

London's new terminal buildings, so long awaited, are seen to form a fresh, spacious and fitting setting for this "gateway to Europe." The heading picture is a view of the "airside" of the passenger-handling building, showing the ramps leading down to the apron, with the control tower in the background. The airline operation block is under construction on the right of the picture. Centre, the staircase leading up from the main first-floor concourse, shown in the photograph on the left. The spacious impression inside the building contrasts markedly with the existing accommodation on the Bath Road site.

CENTRAL

Above, the main restaurant overlooks the central ramp and the aircraft stands. Architect of the central-area buildings is Frederick Gibberd, F.R.I.B.A., M.T.P.I., who based his design for the passenger-handling block on the two main principles of simplicity and flexibility of operation. Right, the airside gallery, along which passengers move from waiting rooms to apron ramps. Below, one of the waiting rooms on the airside of the building. Contemporary English furniture has been chosen throughout, with various colour schemes to "punctuate" the different sections of the building.

"FLIGHT" PHOTOGRAPHS

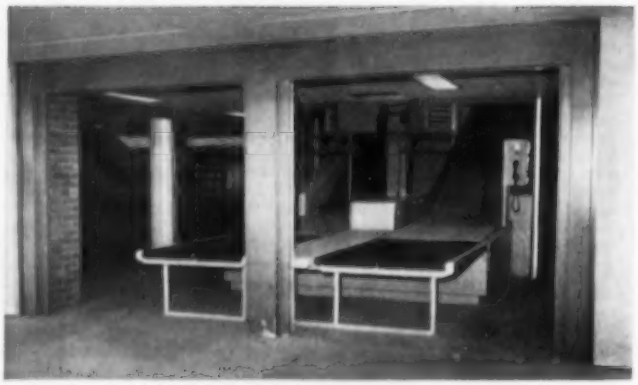
The lounge and buffet located on the second floor, between the balcony lounge and the restaurant. The roof garden from which passengers' friends will be able to wave farewell, adjoins this lounge.

LONDON AIRPORT CENTRAL . . .

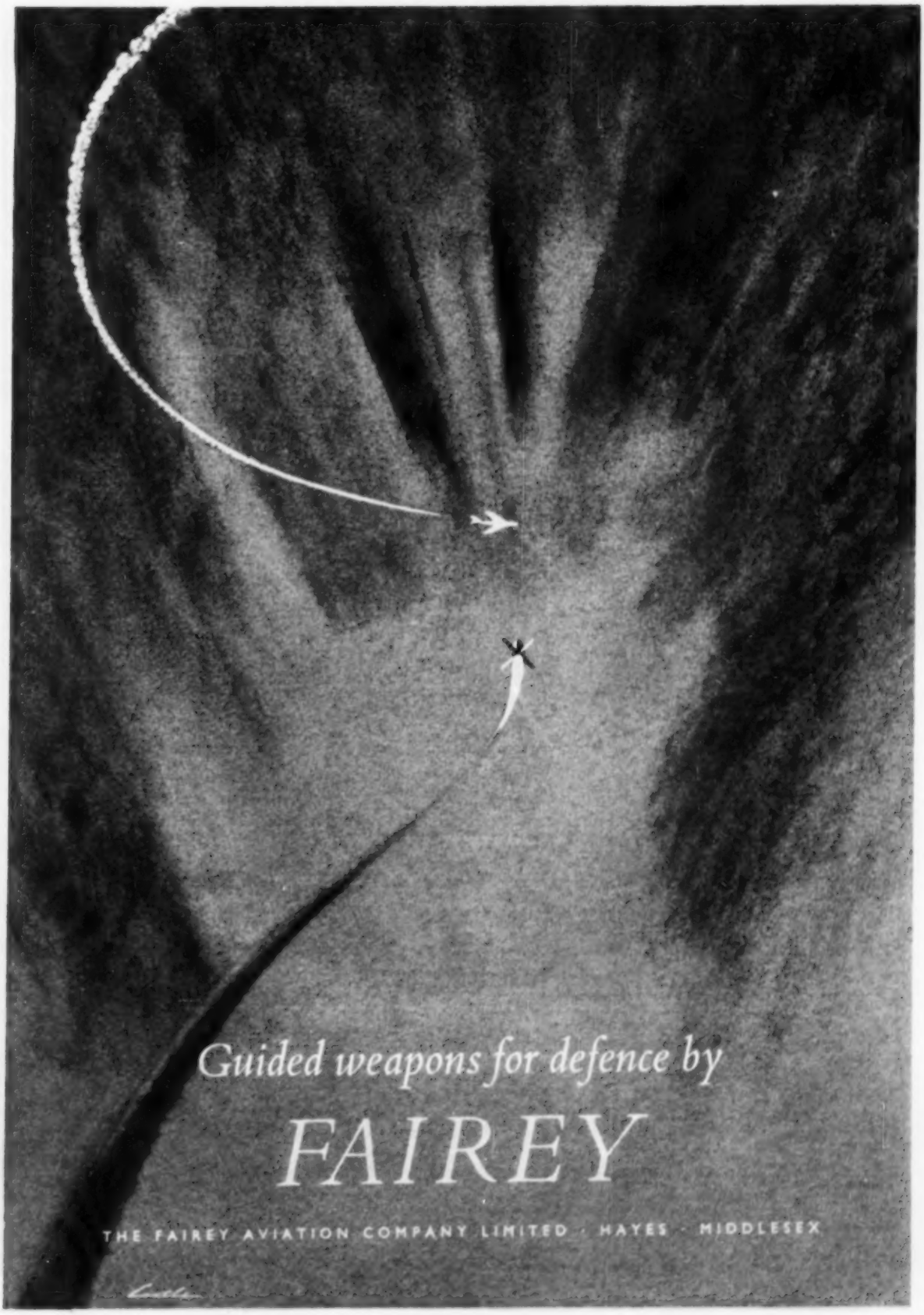
examination according to their place of origin and final destination. (4) Internal passengers, travelling between places in the United Kingdom, without control formalities.

Special facilities are provided for each type, and in addition there are passenger amenities, facilities for technical staff working on the apron, and accommodation on roof terraces for spectators.

The continental section of the building has been planned at first-floor level as a series of transverse bands containing the main concourse, customs, immigration, health and waiting rooms. Ten parallel passenger-channels (six of which are initially to come into use on April 17th) cut across the bands at right angles, between the "landside" and "airside" of the building. Each channel is served by a baggage conveyor-belt running beneath the first floor, except in the customs hall, where the baggage moves up into the hall for inspection at the same time as the passenger arrives there.



Above, two of the baggage conveyor-belts, used in conjunction with the appropriate passenger channels. They are reversible, and are operated and stopped automatically. Left, typical example of the "transverse-band" arrangement is the immigration hall, across which (not along which) passengers are "processed."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FERRY 604

The Diary of a Viscount Delivery Flight to Montreal

By ROBERT J. BLACKBURN

HURN, *Wednesday, March 9th, 1 p.m.* All is ready for the departure of 604—or, to give the aircraft her full title, Viscount Type 724 CF-TGL, first of her type to be built at Hurn. Ferry 604, our flight number, derives from Trans-Canada Air Lines' practice of referring to aeroplanes by numbers rather than letters. Their first, second and third Viscounts, built at Weybridge and already delivered, are 601, 602 and 603.

Preparing the Viscount for her transatlantic flight is, I find, only one aspect of the complicated process of dispatching a new aircraft from factory to operator. The centre of all the activity is the pilots' office at Hurn, presided over by Guy Morgan, the ex-Supermarine pilot concerned with customer relations. Telephones ring constantly. At frequent intervals a Heron or Dove arrives to unload pilots, passengers, documents and the latest news from Wisley. Outside the office an assorted fleet of motor vehicles provides surface transport to all parts of the sprawling Hurn works; within, a cheerful young Scotswoman miraculously combines secretarial efficiency with the ability to produce cups of hot tea at all times.

Here I meet Bill Bird, T.C.A.'s contracts representative at Wisley, who has come to inspect and accept 604 on behalf of his company and to check all the documents taken on the delivery flight or retained in England. The list is formidable . . . acceptance certificate, Vickers approved certificate, aircraft receipt, certified paid invoice, journey log book, flight manual, certificate of airworthiness, D.O.T. Form 2445, radio licence and inventory of equipment. . . .

The proverbial fine-tooth-comb scrutiny of 604 finds no defect more serious than a dead battery for an emergency light and a crinkle on one corner of the cabin floor-covering, so Bill takes a deep breath and signs away x thousand dollars. Having accepted the aircraft he must now sign it back to Vickers-Armstrongs, for delivery flights are the manufacturers' responsibility.

Officially, all of the seven people who embark in 604 are classed as crew-members, though two of us must admit to supernumerary status. In command is Colin Allen, who joined Vickers' flight-test staff from B.E.A. some three years ago. His co-pilot is Peter Marsh, a more recent recruit to Wisley and also ex-B.E.A. There are two navigator/radio-operators—Bill Bower and George Wood. Bill is yet a third ex-B.E.A. man, and George's marked preference for comfortable, four-engined aircraft stems from some years of service in R.A.F. Washingtons. The flight engineer is Bob Rampling, a veteran member of Vickers' aircrew staff with 2,800 test-flying hours in his log-book. For Bob the transatlantic crossing is a new experience, but his colleagues have all participated in one or other of previous Viscount deliveries. The supernumeraries are Willy Thomas, an electrical specialist on his way to Winnipeg for liaison duties with T.C.A., and the writer.

"Flight" photographs

Sunlight plays on a burnished Dart-cowling as 604 approaches the peaks of southern Greenland. Beyond lies Bluie West One.

We climb aboard the gleaming, silver-and-red aircraft, its flawless interior a reminder that 604 has flown not quite 20 hours. The Darts are quickly started, and their kettle-whistle is the signal for a great deal of farewell waving to 604 as she rolls majestically along the perimeter track. We reach the runway—and turn back, with a faulty hydraulic-pressure gauge. Embarrassed, we disembark to smoke a disconsolate cigarette while the gauge is rectified. An hour later we are really on our way—climbing at 180 kt indicated to join Airway Amber One at Daventry.

The distance to Prestwick, our first refuelling-point, is only 315 nautical miles, so it is not worth going above 16,500ft. 604 reaches her cruising height in quarter of an hour to hum along in calm air at 280 kt. Sunshine floods the cabin, empty but for four double chairs and a few packages, including personal luggage, a ten-man life raft and minor spares for dispersal *en route*. The full seating for 40 passengers will not be fitted until the

Though T.C.A. formally accept their Viscounts in England, the aircraft are temporarily returned to Vickers for ferrying to Montreal (via the route below). At right, test-pilot Colin Allen, in duffle-coat, is signing a receipt for "604" while T.C.A.'s Bill Bird looks on.

FERRY 604 . . .

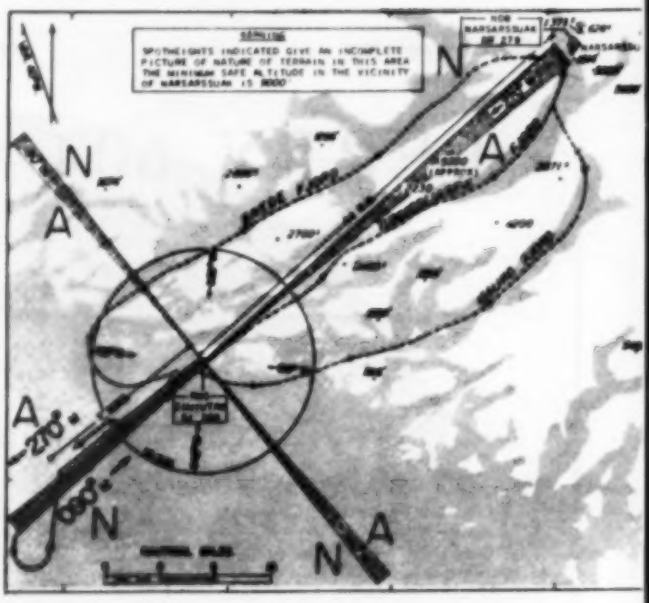
aircraft reaches Canada, since the chairs used by T.C.A. are of American manufacture.

Up front there is distinctly less room to spare. T.C.A.'s Viscounts are designed for two-crew operation, whereas we shall have three or four hands on deck at all times. The left-hand seat will be occupied by either Colin or Peter, who are flying alternate legs, with the duty radio operator on the right. Navigation is performed in the right-hand freight compartment, situated immediately aft of the flight deck and temporarily equipped with a Loran scope, our main aid to navigation on the over-ocean legs.

Prestwick, March 9th, 4.30 p.m. We reach Prestwick 1½ hr after take-off, to be welcomed by T.C.A.'s station manager, John Gilmore, who sees that 604's tanks are replenished with JP-4 and her galley loaded with ready-prepared meals and fresh coffee for the crew. The met. office gives us a reasonable forecast for Keflavik, and as we cannot force on to Bluie West before daybreak there is time for dinner at the airport hotel before take-off. We begin the 743 n.m. stage to Keflavik at 6.22 p.m. Once again the air is smooth at our cruising height—24,000ft—and 604 is performing beautifully. Contrary to normal airline practice, T.C.A.'s advertising modestly credits the Viscount 724 with a cruising speed of 322 m.p.h., whereas George's calculations show that we have a true airspeed, at normal cruising r.p.m. (13,600), of 286 kt—329 m.p.h. But we are not going to set any records on this leg, since a 60 kt beam wind is swinging round into a 50 kt component "on the nose." Loran provides us with all the fixes we need, and London comes through on HF with the latest weather at Keflavik. Half-way through our flight Aurora Borealis brings the sky to life; we are passing beneath an arch of dancing, shimmering lemon-coloured light. The vision has faded when we reach our reporting point at Lax, 68 n.m. from Keflavik. There are scattered clouds 2,000ft above our destination, but visibility is 10-15 miles. We make a visual approach and touch down on the 10,000ft-plus runway 3½ hr after leaving Prestwick. 604 taxies to dispersal through a maze of coloured lights and we step out on to wet tarmac. The night air is surprisingly mild: Iceland proves to be several degrees warmer than Southern England.

We enter the terminal, gasping slightly in its oven-like atmosphere. Can this be Iceland? My doubts are dispelled by a notice reading: "Aircrews—have you reported your iceberg today?"

Keflavik, March 14th, 12 noon G.M.T. Our fifth day in Iceland. Each morning we have risen early, eager to set off for Greenland, only to be forced back into frustrated boredom by a gloomy shake of the weatherman's head. The entire operation hinges on weather at Bluie West One. Flying direct to Goose Bay, 1,315 nautical miles from Keflavik by great circle route, would be out of the question for medium-range aircraft such as our Viscount without the guarantee of (a) headwinds of not more than 30 kt or so and (b) "wide open" conditions at Goose; a diversion to the nearest alternate (Seven Islands, 286 n.m. from Goose) plus an hour's holding would be stretching 604's endurance too far. This is a situation which underlines the difference between theoretical still-air range and practical stage-length. One begins to realize why nobody has yet produced an airliner capable of safe, regular operation from London to New York non-stop.



604 is not the only aircraft pinned to the apron at Keflavik by the strong winds and weather which have persisted for the past five days. Two Yorks, notwithstanding their 12-hour endurance and 2,500-mile range, have also been tied up here. True, one set out for Goose on Saturday night, but it turned back when, off Greenland, headwinds cut its ground-speed to about 100 kt.

Meanwhile 604's captain has been seeking permission to re-route the flight, if necessary, *via* Bluie West Eight, otherwise Sondre Stromfjord, the U.S.A.F. base on the north-west coast of Greenland, which has better weather and approaches than B.W.1. Signals have flashed between Keflavik, London, Washington and Montreal and diplomatic wheels have been set in motion. Authority is needed not only to land at B.W.8 but also to uplift U.S.A.F. fuel on the strength of a Shell credit card; "cash down" is the normal rule. So far as B.W.1 is concerned we already hold such authority, but we think some days will elapse before the concession can be extended to cover B.W.8 also. (Later we are to learn that permission arrives an hour after our departure from Keflavik.)

Over the past two or three days we have heard reports of heavy snow-falls at B.W.1 and the prospect of an early move seemed

Brief interlude at Bluie West One. Though the runway was completely covered in snow and frozen slush the Viscount pulled up in half the 6,500ft strip without recourse to the Maxaret brakes.

(Left) International Aeradio's approach chart for Narsarssuak (Bluie West One) gives an impression of the difficulty of access to its single runway, situated on the NE range leg 44 n.m. from Simiutak. The dotted lines show alternative ways of approaching the field, which can be used only by day in good weather, for reasons obvious from study of . . .

. . . these two views of Tunugdliorfik Fjord, as seen from the Viscount during final approach to B.W.1.

remote when, yesterday morning, F/L. Fred Diamont, who controls R.C.A.F. Sabre movements through Keflavik, received a teleprinter signal forecasting that the airfield would be snowbound until Thursday or Friday next. This morning, however, we learned with surprised pleasure that Bluie's runway is usable (though it offers only "fair" braking conditions) and that good weather is forecast there for most of the day.

George and Bill, our navigators, have prepared their umpteenth flight plan since 604's arrival at Keflavik and now the moment of departure is near. Navigationally, the Iceland-Greenland leg is the most difficult stage of the journey. Loran coverage is poor in these latitudes and headwinds are likely to be both strong and unpredictable. Flight planning has been considerably simplified by the performance and consumption calculations worked out in advance of transatlantic Viscount delivery flights by Vickers' analysts at Weybridge. The accuracy of these figures, which were closely checked on the first two deliveries, may now be taken for granted.

An important part of flight planning is the selection of our cruising altitude. In still air it is always desirable to fly at 24,000ft or above, except on very short stages, but we must take into account the possibility of extreme disparity between the headwind components expected at high and medium levels respectively. To assist them in making this decision, 604's navigators have been provided with a graph showing the ground nautical miles flown

Touch-down: the Viscount skims onto Narsarssuak's snow-covered runway. The landing is made uphill and take-off — unless made into a wind of 25 kt or more—is in the reverse direction.

(Left) A last look at Bluie West as 604 climbs steeply away for Goose Bay and Montreal.

"Flight" photographs

Navigator Bill Bower (left) contemplates the spaciousness of the eight - seat, "transatlantic-style" Viscount, while co-pilot Peter Marsh (right) fortifies himself in preparation for a spell in the left-hand seat.

FERRY 604 . . .

per pound of fuel for any likely combination of headwind component and cruising height.

In the event of inability to land at Bluie West One, due to bad weather or some unforeseen factor, our alternate will be Keflavik. It is necessary, therefore, to fix a critical point on the route at which sufficient fuel will remain for an about-turn to Keflavik plus 2,000 lb for an hour's holding on our return. This critical point is little short of our destination—provided that the decision to return is made before 604 begins her descent.

Our intention is to leave B.W.1 as soon as possible after refuelling, taking full advantage of the fair weather while it lasts. The two Yorks have already set off for Goose Bay, naming Bluie as their alternate.

We take leave of Binnie Thorvaldson, T.C.A.'s station manager at Keflavik, and F/L. Diamont—two people who have done much to ease the burden of our enforced stay within the confines of this bleak airport—and thankfully climb aboard 604. At 12.58 she is airborne, to climb swiftly through the thin overcast into the cold, clear blueness which is the Viscount's element. Navigation has its problems during the first part of the journey; our only fix is obtained from a single Loran line crossed with back bearing from Keflavik range. We are unable to contact weather-ship *Alpha*, whose station lies half-way between Iceland and Greenland. At the mid-point, however, George has established the wind at 24,000ft as 105 kt from 260 degrees instead of the forecast 100 kt from 200 degrees. The Viscount alters course accordingly and now communications begin to improve. Bill makes contact with London and Keflavik on H.F. and obtains the latest forecast for Goose Bay; Loran is working nicely and we are relaying position reports for the two Yorks. Greenland is visible 50 miles away and our position is easily pin-pointed as we cross the east coast and make for Simiutak radio-range station. There is scarcely a cloud in the sky, so we would have no difficulty in letting down over the mountains (which hem in Bluie West) instead of descending over the range and approaching *via* one of the tortuous fjords which are the only means of entry in marginal weather conditions. But study of such terrain in fine weather may pay dividends on future occasions so we descend to 1,000ft at Simiutak for a normal procedure approach. 604 weaves her way above the deep blue water of the fjord towards the unseen runway ahead, great white and brown masses of snow-covered rock mirrored in her gleaming wings. A thump and a rumble beneath her cabin floor as the wheels snap into the airstream. One more gentle turn and the runway appears beyond the crust of ice which fringes the end of the fjord.

Powdery snow and frozen slush prove a better landing surface than one would expect, and 604 rolls almost to a standstill within half the runway's length. The flight from Keflavik, 804 n.m. away *via* the fjord, has taken 4 hr 12 min; headwinds, plus the let-down procedure, have subtracted a good deal from our cruising speed of 286 kt. We disembark in brilliant sunshine and snow-glare and make for the weatherman's office, pausing only to pay the $10 56c landing fee. Our flight-planning is well under way as the Yorks arrive at Bluie, having received ill reports of Goose weather.

Bluie West One, March 14th, 7.20 p.m. G.M.T. Airborne for Goose Bay. The flight plan names Seven Islands as our destination, but an improved forecast of 5,000ft cloud-base and 5-8 miles visibility at Goose allows us to proceed as originally planned. Now the navigators can relax—Loran fixes all the way to the airways entry point at Caplin, then along the range to Goose; H.F. contact with Goose, Gander, Shannon and London; cruising

604's servicing needs were ministered to en route by Willy Thomas (left), seen at work in the air, and flight-engineer Bob Rampling, here performing a nosewheel check at Keflavik.

speed 280 kt at 16,000ft. A 70 kt headwind swings to 70 on the beam, slackening to 25 kt.

At dusk, the first faint glimpse of Labrador through misty cloud—a television-screen picture of straight roads and patches of colourless forest against grey snow. Headwinds considered, 604 reaches Goose in good time—672 n.m. in 3 hr 3 min.

Goose Bay, March 14th, 11.29 G.M.T. 604 soars into the clear night air in a flurry of fine snow, which lies thick and dry on the runway. Airways control have restricted us to 16,000ft on this 716 n.m. last leg; perhaps the R.C.A.F.'s night fighters are at exercise. The headwind has dropped to 20 kt, and the air is smooth. Despite their long duty day, 604's crew show no signs of fatigue, and one blesses the Dart turboprops which have carried us so far in such comfort. Paradoxically, flying has been the least strenuous part of our journey. Patterns of gleaming lights confirm the instruments' messages as we identify one radio range after another *en route* to Montreal. Touch-down is at 2.18 a.m. G.M.T. on Tuesday, March 15th. We re-set our watches and it is Monday again.

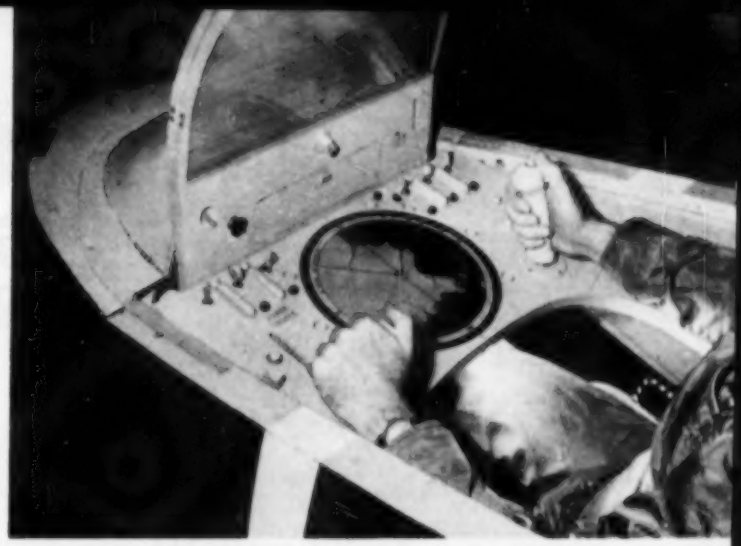
Journey's end: George Wood (left) and Bill Bower take time off from navigation in downtown Montreal.

RADICALLY NEW COCKPIT DESIGN

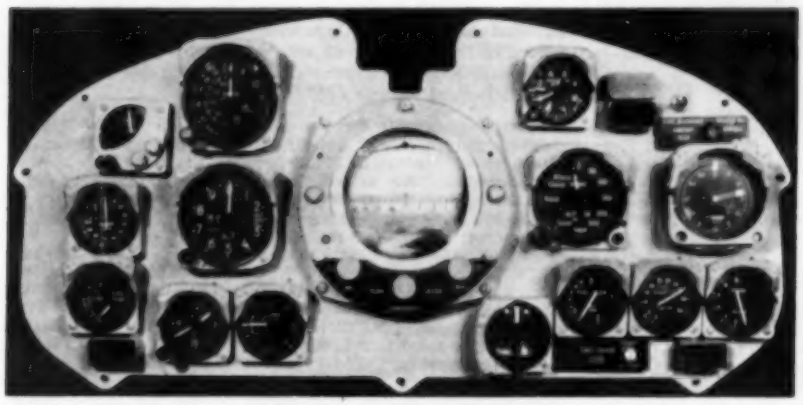
U.S. Navy's Television Instrumentation

A RESEARCH programme is now under way in America—under the overall guidance of the U.S. Navy Bureau of Aeronautics—which should lead to the appearance in about three years' time of a completely new type of cockpit layout and instrument presentation. Some aspects of this work were described in our issue of July 9th last year, when information was given concerning a pictorial attitude and course presentation tried out in a F9F-5 Panther. This represented an attempt to simplify the panel as it then stood, by combining the functions of compass and artificial horizon in one easily read dial. It was hinted that work was in progress on a very much more advanced concept which would radically affect design.

It is the first result of this programme which has now been disclosed by the U.S. Navy and the companies concerned in the work. Prime contractor and the co-ordinator of the instrumentation side is Douglas Aircraft, El Segundo Division. The proposed cockpit, as the accompanying photographs show, is radically new. All controls, including the stick (much abbreviated) and throttle, are on a console resembling an ordinary school desk, in the centre of which is mounted a circular plan position screen. Most of the flight-instrument indications are presented on a transparent vertical screen before the pilots eyes.



Side view of the Douglas mock-up for the new cockpit layout, showing the pilot holding the two basic controls, throttle and stick, and looking at and through the flat television tube. The plan-position tube is between his hands. A simple warning signal indicates "Power unsafe" in case of any one of a series of failures drastically affecting the engine.



The initial simplification of the panel tested in a Grumman Panther and described in "Flight" of July 9th, 1954. The pictorial heading and attitude indicator is surrounded by combined Mach meter/A.S.I., veeder altimeter and radio altimeter, among others. The large dial on the right is described as a "self-contained automatic rho-theta (distance/azimuth) indicator." Warning lights illuminate written notices, at top right, to indicate malfunctions of various kinds.

Both the horizontal and vertical screens are examples of a recent development by the Electronics division of Willys Motors, Inc., in competition with a number of other firms. The vertical screen is in fact a television screen utilizing a new type of flat television tube consisting of a phosphor screen hermetically sealed between two plates of glass. An electron gun, very closely focused, projects along the screen a beam which is deflected as required by voltages applied and deflector plates. It is thus possible to obtain high definition and brightness with 2,000 lines—better than commercial television. The screen is transparent and does not interfere with the pilot's vision while he is flying V.F.R.

A type of map presentation of the ground is given on the horizontally mounted P.P.I. screen, together with navigational details, distance and vector-to-base information and indication of remaining fuel. This information can be selected by switches. The indications strictly concerned with flight attitude, speed and height will appear on the vertical screen, with some new form of presentation—probably as an actual picture of the ground ahead.

This is perhaps the most comprehensive cockpit design project so far published, and, typically, it is a U.S. Navy undertaking. Although American cockpit design in general has for some years been of a very high order, instrument layout has not kept pace. The U.S. Navy has generally been in the forefront in such schemes and was first to adopt a standard blind-flying panel layout. A similar arrangement has now also been standardized by the U.S.A.F. Previously, there was no equivalent to the R.A.F. standard panel and in many ways the performance of conventional American flight instruments is not as good as that of British-made equivalents.

The control-lever layout proposed for the new U.S. Navy cockpit must bring with it basic problems in control transmission design, not least on the aerodynamic side. This, however, will be considerably eased since the general introduction of powered controls has removed the need for many of the bulky mechanical adjuncts of the old systems.

One problem which will certainly have to be considered in the new layout is escape for the pilot. The "desk" is so arranged, in the mock-ups at least, that there is no clearance for the pilot's knees in the event of use having to be made of an upward-ejection seat; downward ejection will have to be provided for, and this will call for careful arrangement of units, close to the cockpit, such as nosewheel and armament. It is not considered likely that an escape capsule is in view, since the weight of capsules so far designed calls for a parachute too large to deploy safely at any reasonable post-ejection falling speed.

A prime factor in the television screen instrumentation arrangements will evidently be reliability, but no further information is yet available to indicate the steps being taken in this direction.

SOVIET HIGHER PROMOTIONS

BY recent decree, a rank which has hitherto not existed in the Soviet Air Force—Chief Marshal of the Air Force—has been conferred upon Marshal of Aviation Pavel Fedorovich Zhigarev. Colonel-General of the Air Force Sergei Ignatyevich Rudenko is accorded the rank of Marshal of the Air Force, as is Colonel-General of the Air Force Vladimir Alexandrovich Sudets. The new Soviet Chief Marshal of the Air Force—Zhigarev—was appointed C.-in-C. of the Soviet Air Force in July 1950. He is also a "candidate member" of the Central Committee of the Communist Party of the Soviet Union—the governing body in the country.

Rudenko was referred to in a Moscow announcement last year as Chief of Staff of the Soviet Air Force. Sudets was last mentioned during 1944, as C-in-C. of the Air Force, Ukranian Front, and as Air Force Chief of Staff in 1947.

No. 47 Squadron

History of a Famous Transport Command Unit

BY JOHN YOXALL

Sir John Slessor presents the Squadron Standard; the Bearer is F/O. B. D. Weatherley. On the left is G/C. S. P. Hagger, and on the right S/L. D. P. Boulnois, C.O. of No. 47 Sqn.

Against a background of their Handley Page Hastings aircraft, No. 47 Squadron parade with their newly presented Standard.

ON March 25th, at Abingdon, Berkshire, Marshal of the Royal Air Force Sir John Slessor presented a Squadron Standard to No. 47 Squadron. In the course of his address after the presentation Sir John said: "A Royal Air Force squadron is not merely a collection of men, equipment and weapons, but a living entity with a history and a spirit of its own possessing qualities which could be best summed up by the word morale."

No. 47 Squadron, Sir John continued, had had an extremely interesting and varied history, having operated in Macedonia, Russia, the Sudan, Abyssinia, the Mediterranean, Burma and Java. He himself had visited the squadron in the Sudan and Burma, and his most recent encounter with the unit, prior to the Standard presentation, had been during the Berlin Airlift, when he had travelled in a No. 47 Squadron Hastings, carrying a load of coal from Schleswigland to Berlin.

Even apart from its present duties in flying the main routes in Transport Command Hastings, No. 47 is truly a well travelled unit. The battle honours selected for its Standard demonstrate this fact; they are: Macedonia 1916-1918; East Africa 1940-1941; Egypt and Libya 1942; Mediterranean 1942-1943; and Burma 1945.

Formed specifically for the defence of Hull against raiding German airships, No. 47 Squadron came into being at Beverley, Yorkshire, on March 1st, 1916. It may, indeed, be more than a coincidence that No. 47 will be the first transport squadron to have the new Blackburn Beverley.

The unit's first commanding officer was Maj. F. G. Small, who, as an officer of No. 5 Squadron, was one of the pilots of the original Royal Flying Corps contingent to go to France with the British Expeditionary Force in August 1914. In France he had distinguished himself at the battle of Le Cateau by landing (with Lt. A. E. Borton—now retired as an air vice-marshal—who recently presented No. 27 Squadron with its Standard) alongside a cavalry patrol to deliver an urgent message for transmission to Field Marshal Sir Douglas Haig. The German cavalry entered the field just as the Henry Farman took off. Later, in company with Lt. Louis Strange (who during the last war took a major part in training paratroops) and flying an Avro 504 with a Lewis gun *tied* to the centre-section struts, he forced a German Albatros down and landed alongside to take the pilot prisoner.

Although in 1916 bombing by the Zeppelin airships caused almost as much stir as the possibility of atomic bombing does

(Left) F/O. (now G/C.) J. B. T. Whitehead flying a No. 47 Sqn. Gordon past Jebel Kassala in 1933. (Right) Old and not so old: an Arab dhow anchored alongside a Fairey Gordon floatplane on the Nile at Khartoum in 1934.

today, it was a comparatively leisurely period for the defenders. The interception system was dependent on the senior R.F.C. officer present on the station ordering the pilots to patrol after hearing that a raid was imminent.

A patrol was at 8,000 to 10,000 ft and lasted—if everything kept going—for two hours; but the relief aircraft took off at 1½ hours to ensure continuity. The machines were armed with Ranken darts and bombs, to be dropped on the enemy airships from above. A major snag was that usually the airship had a higher ceiling than the aeroplane, and certainly a better rate of climb.

After a short period as a home-defence unit the role of No. 47 Sqn. changed; two half-flights were absorbed by No. 33 Sqn. and the remainder re-formed for foreign service.

On September 20th, 1916, the unit disembarked at Salonika, Macedonia, and, under the command of Maj. C. C. Wigram, went for a short time to Mikra Bay. Later a move was made to Yanesh, on the Doiran front, where Maj. F. F. Minchin took over command. One flight was detached at Snevche.

At this period the squadron was equipped with two flights of Armstrong Whitworth F.K.8s and one flight of Bristol Scouts. The performance of the F.K.8 reads strangely in these days of stratospheric flying at supersonic speeds: it took 35 minutes to climb to 10,000 ft, where its cruising speed was roughly 65 m.p.h.

The squadron's first successes came when, on December 23rd, Capt. W. D. M. Bell shot down an enemy two-seater, and on January 19th, 1917, when 2nd.Lt. C. ff. Denning brought down another. Denning's victim landed intact within the British lines.

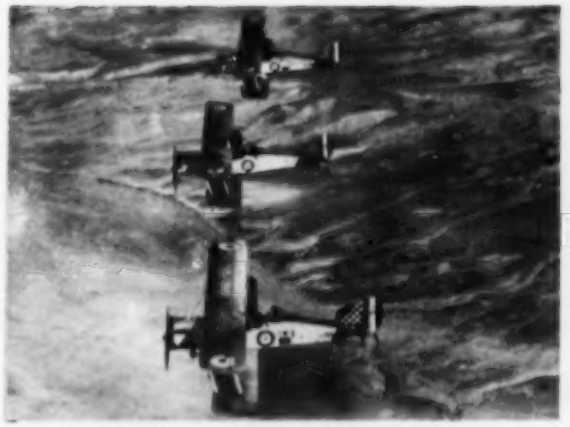
The first major air battle in which No. 47 took part occurred on February 27th, when the squadron attacked a formation of twenty German A.E.G.s returning from an effective raid on Summerhill camp—the British base established just outside Salonika. There were no casualties on either side. The raiding German unit, No. 1 Kampfgeschwader, was continually meeting No. 47 and its companion squadron, No. 17, both during and after the battle of Doiran.

An instance which portrays clearly the spirit then existing between the rival air forces occurred on October 29th, 1917. On this occasion five of No. 47's aircraft were attacking a dump at Cestovo when they were jumped by eight Albatros and Halberstadt fighters. In the ensuing fight 2nd Lt. P. D. Montague in a B.E.12 and 2nd Lt. J. R. F. Gubbin with Air Mech. T. H. Bury in an F.K.8 were shot down. Shortly after the incident a message was dropped on Yanesh airfield which read: "On the 29th October, 1917, one of your comrades met with a hero's death in an air fight. He was buried with due honours and a memorial stone has been put up over his grave, but without an inscription as his name is not known to us. In order that we may make good this deficiency kindly inform us as to his name and the date and place of his birth".

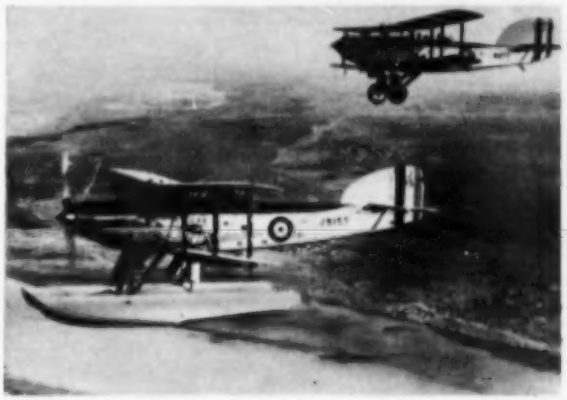
In January 1918 the German cruiser *Goeben* ran aground after making a sortie from the Dardenelles and three aircraft from No. 47 Sqn. and three from No. 17 left the front temporarily to attack the ship. She was bombed by day and night from the 22nd to the 24th but suffered no appreciable damage from the 15 tons of light bombs aimed at her.

On April 1st, 1918, the day on which the Royal Flying Corps and Royal Naval Air Service combined to become the Royal Air Force, a fighter squadron, No. 150, was formed out of the S.E.5-equipped fighter flights of Nos. 47 and 17 Sqns. The new unit was commanded by Maj. W. R. B. McBain of No. 47.

With the departure of their fighter flights the two older units became corps squadrons. The day of specialization had arrived, but No. 47 still had a variety of tasks to perform—artillery observation, bombing, photography and visual reconnaissance. New flying equipment came in the form of D.H.9s.



Squadron D.H.9as, with chequered markings, over the Sudan in 1927.



No. 47 was, for a long while, amphibious. Above are shown landplane and floatplane versions of the Fairey 3F over the confluence of the Blue and White Niles at Khartoum in 1929.

Having played a considerable part in the final rout of the enemy in Macedonia, the unit ended its first life when it became "A" Squadron, R.A.F. Mission, South Russia.

In this campaign to support the White Russians against the Soviet forces the squadron was at first under the command of Maj. F. A. Bates (now a director of the Cunard Line) and later of Maj. R. Collishaw, who was credited with destroying 60 enemy aircraft in the 1914-18 war and was A.O.C. No. 202 Group in the Western Desert when in the second world struggle, Italy joined the enemy. He is now retired with the rank of air vice-marshal.

Operations in Russia consisted mainly of low bombing attacks and ground strafing. There was an outstanding incident in July 1919, when one of the squadron aircraft was shot down during a raid on Tcherni-Yar. Seeing the machine on the ground, another pilot alighted nearby and picked up its two occupants,

(Left) A Vickers Wellesley over typical terrain during the East African campaign in 1940-41. It is not certain that this actual aircraft belonged to No. 47. (Right) Aerial coalheavers: loading coal into a 47 Sqn. Hastings during the Berlin Air Lift.

In polar regions: supplies were dropped on the Ice Cap for the British North Greenland Expedition in 1952.

A Grumman Albatross—the triphibious version with retractable skis—puts down alongside the crippled Hastings on the Greenland ice-cap. It was able to take off some of the Hastings crew after they had been stranded for nine days.

No. 47 SQUADRON . . .

taking off just as the Soviet cavalry arrived. He then returned to base with the two unexpected passengers in the rear cockpit, and his own observer standing on the lower wing, a thumb blocking a bullet hole in one of the petrol tanks. The rescued pilot was Capt. W. Elliot, who became Air Chief Marshal Sir William Elliot, A.O.C-in-C. Fighter Command, before retiring in 1954.

In 1920, No. 47 Sqn. was reformed at Helwan, Egypt, and was given a foretaste of its present role—air transport. One of the first jobs was to assist the surveying and marking of the Cairo-to-Baghdad air route—furrows were ploughed across some stretches of the desert as a primitive aid to air navigation—and later the squadron flew some of the early mail services over the route.

In 1925 three de Havilland 9as of No. 47, commanded by the late Air Marshal Sir Arthur Coningham (then a squadron leader) made the first R.A.F. flight from Egypt to Kano, Nigeria, where they were greeted with great enthusiasm by thousands of people who had never before seen an aeroplane. This flight pioneered the route which during the second war became a vital supply line; over it more than 5,000 aircraft were flown to equip and reinforce squadrons in North Africa and other war theatres during the critical period when the Mediterranean was closed to our shipping. The D.H.9as covered 6,500 miles in 85 flying hours.

At this time the unit was maintained by a detachment at Khartoum, until, in 1927, the whole squadron moved there. At the end of December 1927 No. 47 was re-equipped with Fairey 3Fs. Photographic reconnaissances and patrols in conjunction with the Sudan Defence Force formed part of the normal activities; and in 1930 another pioneering flight was made across Africa, this time continuing as far as Gambia. The squadron also undertook four of the early R.A.F. training flights to the Cape. Many distinguished personages travelling in the Sudan and neighbouring territories were carried in the squadron's aircraft—including the Duke of Windsor (then Prince of Wales), the Duke of Gloucester and King Albert of the Belgians. The silver two-handed goblet presented in appreciation by the Prince of Wales still decorates the officers' mess at Abingdon, where the squadron now is.

In 1936 No. 47 was again re-equipped, this time with Fairey Gordons and Vickers Vincents. Some of the Gordons were fitted with floats, and undertook patrols over the Red Sea.

Just before the war the squadron was re-armed with Vickers Wellesley bombers; and when Italy entered the struggle on June 10th, 1940, the unit was based at Erkowit, in the Red Sea hills. Its first raid, made on June 11th, was a bombing attack by eight Wellesleys on the airfield at Asmara, the Eritrean capital.

In July the squadron moved to Carthago and in the months following continued its raids on Italian aerodromes, particularly those at Asmara and Gura and military concentrations at Azoza and Gondar. In November a detachment operated from Khartoum and at the end of the month the squadron headquarters moved there, with detachments at Kassala and Agordat carrying out photographic reconnaissances and strikes on enemy gun positions and troop concentrations. The squadron moved to Asmara in the following May, after the surrender of the Italian forces in Abyssinia.

While at Asmara the crews were engaged in supply-dropping missions to our armed forces at Debarech until the fall of Gondar on November 28th, 1941, when the war in East Africa ended.

At the end of December the squadron left the Sudan for Egypt, arriving on January 25th, 1942, at Burg el Arab, where it remained until April 1st without carrying out any operational patrols. A move was later made to Kasfareet.

On April 16th, 1942, No. 47 Squadron Air Echelon was formed from one Wellesley flight, which was first located at Burg el Arab, later moving to Shandur and St. Jean. Convoy patrols and anti-submarine patrols were flown off the Delta area and the coast of Palestine until the end of February 1943 when the echelon was disbanded.

The squadron moved to Shandur on September 8th, 1942, and in October was flying Beauforts. A detachment was operating from Gianaclis and until November many torpedo strikes were made against enemy shipping, with excellent results. During November a number of searches were carried out, but only one strike was made. This was on the 1st of the month when three aircraft took off to strike against a destroyer-escorted enemy convoy, off Tobruk, carrying supplies to Rommel's Afrika Corps. A torpedo hit was obtained on an oil tanker and the explosion of the torpedo was followed by a much larger one in which the entire ship disintegrated.

Anti-submarine patrols from Gambut to Berke were the principal occupation during December and the early months of 1943. From the end of January to the middle of February the squadron was stationed at Gianaclis but operated from Benghazi, being employed in providing air cover to convoys carrying supplies to the Eighth Army in the drive to push the Afrika Corps out of North Africa. A further move was made to Misurata West, Tripolitania, on March 3rd. At the beginning of June the squadron began conversion to torpedo-carrying Beaufighters.

From June 22nd, 1943, No. 47 was located at Protville II airfield, near Tunis, making a goodly number of strikes against enemy shipping off the coast of Italy, Corsica and Sardinia. The first of these was extremely successful, a large motor vessel towing barges being sunk. During the squadron's stay at Protville there strikes continued to add to the scoreboard. A move was made to Sidi Amor on October 17th.

Less than a week after arriving at Sidi Amor the squadron received orders to move back to Gambut, from where it was to take part in the Aegean campaign. Operations consisted chiefly of offensive sweeps of the Eastern Aegean for enemy craft preparing for the invasion of the islands of Leros and Samos. During the week beginning November 3rd the German invasion

Commanding Officers

Maj. F. G. Small	March 1916
Maj. O. C. Wigram	August 1916
Maj. F. F. Minchin	January 1917
Maj. G. D. Gardiner	March 1918
Maj. F. A. Bates	August 1918
Maj. R. Collishaw, D.S.O., O.B.E., D.S.C., D.F.C.	June 1919
S/L. G. R. M. Reid	February 1920
S/L. K. C. Buss	December 1920
S/L. M. Henderson	March 1922
S/L. R. S. Maxwell	October 1925
S/L. C. R. Cox, A.F.C.	October 1927
S/L. E. L. Howard-Williams, M.C.	February 1930
S/L. A. McGregor, C.B.E., D.F.C.	January 1933
S/L. G. E. Gibbs, M.C.	November 1934
S/L. A. P. Ritchie, A.F.C.	September 1935
S/L. G. R. C. Spencer	August 1937
S/L. J. D. A. Keary	January 1939
W/C. J. G. Elton, A.F.C.	October 1939
S/L. J. E. Petty-Fry	August 1940
S/L. G. R. MacGill	January 1941
S/L. M. Cooke	April 1941
S/L. D. M. Illsley, D.F.C.	November 1941
S/L. E. B. Grace	November 1941
S/L. L. B. Carr	September 1942
W/C. R. A. Sprague, D.F.C.	October 1942
W/C. D. E. Bennett	December 1942
W/C. A. M. Taylor, D.F.C.	May 1943
W/C. J. A. Lee-Evans, D.F.C.	July 1943
W/C. W. D. L. Filson-Young, D.F.C.	November 1943
F/L. J. H. Etherington, D.F.C.	May 1945
W/C. V. S. H. Bucles	June 1945
W/C. G. H. Melville-Jackson, D.F.C.	October 1945
W/C. W. H. Ingle, A.F.C.	September 1946
S/L. W. P. Peters, D.F.C., A.F.C.	June 1947
S/L. P. J. S. Finlayson, A.F.C.	October 1948
S/L. W. J. McLean, D.S.O., D.F.C., A.F.C.	November 1949
S/L. R. C. Wood	March 1951
S/L. E. W. Merriman, M.B.E., D.F.M.	October 1952
S/L. D. P. Boulnois	October 1954

The Viper powered Folland Midge fighter . . . .

The long life Viper has been type-tested and approved for production at 1640 lb. thrust

(Specified fuel consumption 1-09)

This engine has been specially stressed for all trainer applications

The Viper powered Percival Provost jet trainer

Armstrong Siddeley

ARMSTRONG SIDDELEY MOTORS LIMITED · COVENTRY

Members of the Hawker Siddeley Group

SAUNDERS-ROE LIMITED

No. 47 SQUADRON . . .

No. 47 Squadron Aircraft

B.E.12 and 12a; Armstrong Whitworth F.K.8; D.H.2; Bristol Scout; Vickers Scout; Bristol Monoplane; B.E.2e; S.E.5a; D.H.9	1916-1919
De Havilland 9a	February 1920
Fairey 3F	December 1927
Vickers Vincent and Fairey Gordon	July 1936
Vickers Wellesley	August 1939
Bristol Beaufort	October 1942
Bristol Beaufighter	June 1943
De Havilland Mosquito 6 (one flight)	February 1945
De Havilland Mosquito 6	April 1945
Handley Page Halifax 9	September 1946
Handley Page Hastings 1	September 1948

fleet was harassed by torpedo and cannon and, despite the considerable escorts of Me109s and Ar196s which the Germans used for air cover, a number of ships were sunk and several damaged.

After the Germans had landed the squadron's task was to harass the enemy forces on the beaches and intercept the Ju87s and 88s. Enemy fighters were constantly on patrol and the squadron's losses at the time were particularly heavy.

Working with No. 47 at that time was No. 603 (City of Edinburgh) Squadron, of which the Queen is now the Honorary Air Commodore, and on November 16th eight Beaufighters—seven from 47 and one from 603—were briefed to attack a Siebel ferry carrying German reinforcements. The ferry was located as it was nearing the island, its air cover consisting of Me109s, Ju88s, and Ar196s, numbering 17 in all. Four of the Beaufighters attacked the target in line-abreast formation while the remaining four acted as cover. The four attacking aircraft opened fire simultaneously at approximately eight or nine hundred yards' range in the face of intense heavy and light flak. The ferry caught fire and almost immediately blew up. Their object achieved, the Beaufighters made for base, but in the ensuing fight with Me109s three of the squadron's aircraft were shot down. For the gallantry displayed and the excellent results achieved five immediate awards were made: S/L. G. A. Powell, D.S.O.; F/O. G. G. Adams, D.F.C.; F/Sgt. H. A. Milne, D.F.M.; F/Sgt. V. Borrowdale, D.F.M.; and F/Sgt. G. T. Craven, D.F.M.

For the remainder of 1943 and the early part of 1944 the squadron continued its offensive sweeps over the Aegean, attacking harbours and shipping and causing much damage to port installations.

On February 22nd the squadron formed part of the force which attacked the *Livenzia*, at that time the largest merchant vessel left in the Aegean. Led by the Squadron Commander, W/C. W. D. L. Filson-Young, D.F.C., the attack proved most successful and the *Livenzia* was sunk without any losses to No. 47. For the excellent results of this operation an immediate award of a bar to his D.F.C. was made to W/C. Filson-Young.

During the early part of March 1944 some night intruder operations were flown over Heraklion and Maritza, but few targets were sighted. On March 12th the squadron made its last operational sortie—an anti-shipping sweep—with Middle East Command, notification having been received of an impending move to South-East Asia.

The squadron arrived at Cholavaram in Madras in the latter part of April and, after a period of training, moved to Yelahanka on October 10th, beginning a conversion course to Mosquitoes; this was completed by November 5th, and the squadron then moved up to Ranchi. On arrival it was found that the aircraft were unsuitable for the job in hand and, after a period of inactivity, the squadron was re-equipped once again with rocket-projectile Beaufighters.

On January 13th, 1945, the squadron arrived at Kumbhirgram, Assam, from where it began, a week later, the first of many successful operations against the Japanese in Burma. The tasks were day and night offensive patrols on Japanese lines of communications, road, rail and river transport, Army support ops and attacks on enemy airfields. A successful R.P. operation was flown on January 26th, when four aircraft attacked a building on the Mandalay water-front believed to be an enemy supply centre; direct hits were obtained by all 32 rockets, resulting in the complete destruction of the building. Night patrols were continued as well as daylight armed reconnaissances and the month ended with two attacks on enemy guns that were threatening an Army division on the east bank of the Irrawaddy at Singu. The guns were successfully silenced.

During February a number of Army support operations were flown in connection with the 14th Army's crossing of the Irrawaddy in the area Myingyan-Jennangyaung. These entailed dropping "Pigtails"—one of a number of "canned battle" devices which automatically fired Very lights from the ground on impact —or afterwards, according to the delay setting—and were designed to produce the effect of troop attacks, thus compelling the enemy to disperse his forces. The crossing was made and a bridgehead consolidated with minimum interference and fewer casualties than would otherwise have occurred.

At the end of the month one flight converted to Mosquito fighter-bombers, and day and night operations continued. A detachment of eight Beaufighters was sent to Thazi on February 19th in order that more and longer night patrols could be made, pilots experiencing difficulty in crossing the Chin Hills on return to base after night patrols.

In support of the Army's assault on Mandalay during March, operations were stepped up, over 230 sorties were flown, totalling more than 963 hr. The following list gives some idea of the destruction and damage caused to enemy transport and holdings:—

	Destroyed	Damaged
Locomotives	1	3
Rolling stock	3	91
Motor transport	22	224
River craft	1	11
Bullock carts	20	28
Tanks	—	1
Store buildings	144	109
Petrol dumps	6	—
Billets	39	17
Oil pipeline set on fire	3 times, broken 5 times	

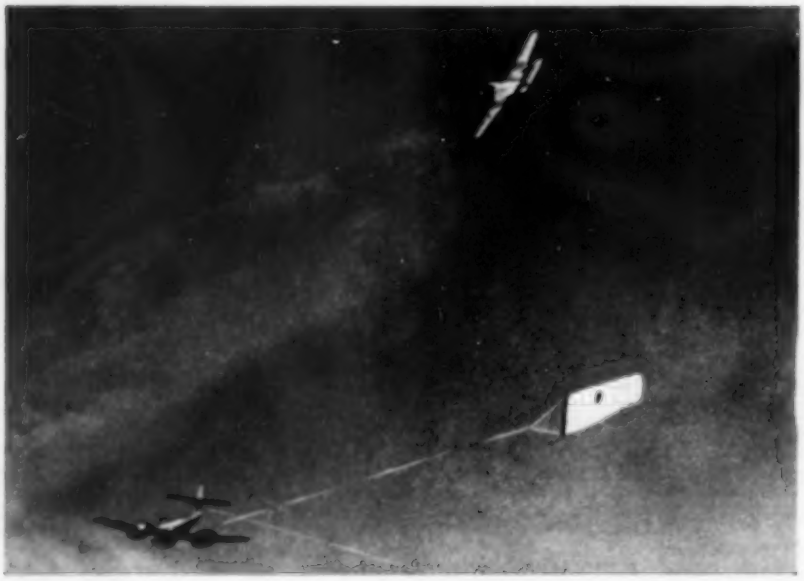
Many attacks were made on Toungoo by both Beaufighters and

(*Continued on page 468*)

The rescued Hastings crew after their arrival at Thule, Greenland.

A 47 Sqn. Hastings aircrew. Left to right: F/Sgt. W. Cash (engineer); Sgt. S. W. Deane (air quartermaster); F/O. H. M. Dixon (navigator); F/L. W. Howell (captain); F/Sgt. R. Pierce (signaller); F/O. J. D. Wilson (co-pilot).

Three of the squadron's Hastings flying in formation through snow over Oxfordshire.



(Right) A Pilot Attack Instructor in a Vampire T.11 breaks off an attack on a target banner, towed by a Meteor F.8. (Below) A Vampire T.11 wheels in for an attack, with the island of Sylt in the background haze.

(Lower right) P.A.I.s at R.A.F. Sylt. Left to right, they are F/O. Brian I'Anson, F/L. Colin Hunt, F/L. R. E. W. Loverseed, F/L. Lee Jones, S/L. W. L. Griffiths, and F/O. J. Atkinson.

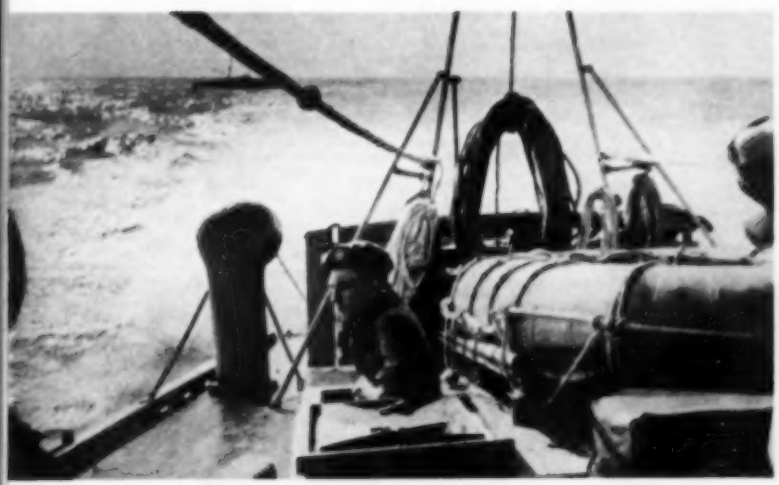
AIR GUNNERY AT SYLT

FOR their periodic armament practice, squadrons—or, more usually, complete wings—of the 2nd Allied Tactical Air Force repair to R.A.F. Sylt, on the site of the former Luftwaffe seaplane base. There they stay for a month at a time, getting in their "shoots" as frequently as possible. The pilots make their initial runs in a Vampire T.11 against a nylon target banner, 25ft in length, towed by a Meteor 8. A sortie may last as long as an hour, with four aircraft taking it in turns to shoot, the shells of their 20 mm guns being dyed in four different colours, by which means the hits are identified. New pilots must learn to close in for the attack until within range and to fly steadily to achieve maximum effectiveness of fire. Should a pilot prove unsatisfactory in either or both respects, he is shown the ciné-films of his runs and given further flights in a Vampire T.11 with a Pilot Attack Instructor to demonstrate his probable errors. At length—just prior to departure from Sylt—he is afforded more realistic practice in attacking a 25ft glider target towed by a Meteor. For the Vampire T.11 the makers claim that it is a steady platform, instantly responsive to small control movements. These, and other characteristics, combine to permit the target to be brought quickly into the sight and rigidly held. Adjustments before firing can be made without risk of over-correction.

F/L. Colin Hunt descends from his Vampire T.11 after giving air-to-air firing instruction. Meanwhile, two W.R.A.F. remove the exposed ciné-film and reload the cassettes, while armourers check and reload the 20 mm Hispano guns.

(Right) F/L. Clyde Sutcliffe and F/O. John Ewens, just returned from the range, wait expectantly for their score to be 'phoned in.

(Below) A marine fitter comes up from the engine room as a patrol boat takes on a sharp angle and works up to 30 knots in a sweep over the range in search of German fishing boats. (Lower right) Sgt. R. W. Low, Coxswain I, reports the air firing range clear of craft.



Two excellent twin-engined combat aircraft, both in production and both referred to on this page: the fourth S.O. Vautour and, above, a Grumman Sentinel of the U.S. Navy.

AIRCRAFT INTELLIGENCE

Great Britain

Avro Ashton. The six Avro 711 Ashtons have, for almost five years, given unsung service, especially at high altitude. All six are different: WB490 originally had a nose probe and has been used for general engine and high-flying research; WB491 (Mk 2) did cabin-air experiments; WB492 (Mk 3), the subject of this week's drawing, was fitted with a pair of bomb nacelles under the wings and a radome under the fuselage (for fairing the aerials and scanner heads of prototype bomb-sight equipment); WB493 is now used for various trials with a pair of podded Bristol Olympus turbojets; WB494 has carried out numerous instrument trials; and the last machine, WE670, at one time fitted with under-wing bomb pods, is now equipped for "universal" testing of Rolls-Royce gas turbines, and has extensive airframe modifications including a pressure bulkhead much further forward than the original.

U.S.A.

Boeing B-52B. A production B-52 was damaged at Edwards A.F.B. recently. The rear undercarriage units collapsed on landing, resulting in severe damage to the undercarriage and belly.

Boeing KC-135. Under a new contract, the Ryan company will build both the rear and centre fuselage sections of this new U.S.A.F. jet tanker/transport (Ryan also make refuelling pods and rear fuselages for the KC-97s). The KC-135 will be much bigger and heavier than the 707 prototype, and will be powered by four 15,000 lb-thrust engines—possibly Pratt and Whitney J75s.

Chance Vought F8U. A prototype of this new supersonic carrier-based fighter is now being erected at Dallas, and should fly this year. Powered by an afterburning J57 turbojet, the F8U has a long cylindrical fuselage with a needle nose, and a small, swept, variable-incidence wing well aft. The structure is very advanced, and incorporates much titanium alloy.

Grumman S2F-1 Sentinel. At upper left is one of the first views showing the Sentinel's magnetic airborne detection "stinger" in its tail. Search radar is carried in the "dustbin," weapons in the bomb bay and beneath the 69ft-span wing, and sonobuoys are ejected from the nacelles.

Martin B-57. This Canberra development (which is not known by its British name) continues to appear in various new roles. The first B-57 was delivered in July 1953. Since then, B-57A and RB-57 deliveries have been made to the 345th Tactical Bombardment Wing at Langley A.F.B., the 461st Tactical Bombardment Wing at Hill A.F.B., the 363rd Tactical Reconnaissance Wing at Shaw A.F.B.; the 3515th Combat Crew Training Wing at Randolph Field and the U.S. 12th Air Force in Germany. The B-57B tandem-seat attack/intruder and the B-57C dual-control trainer are now in production, and the B-57E, a high-performance target tug, is shortly to be built. Details of the executive transport B-57 have already been revealed (*Flight*, October 15th, 1954) and at least three other developments are foreseen.

France

S.O.4050 Vautour. Illustrated on this page is the fourth prototype Vautour. Powered by a pair of Atar 101Es of 7,275 lb thrust each, it is a two-seat bomber capable of carrying out high altitude attacks at near-sonic speed. It has detail refinements compared with the two-seat (Sapphire-powered) third prototype; machine number five will have Avons.

AVRO ASHTON MK 3
(Four Rolls-Royce Nene 101)

Span	120ft
Length	89ft 7in

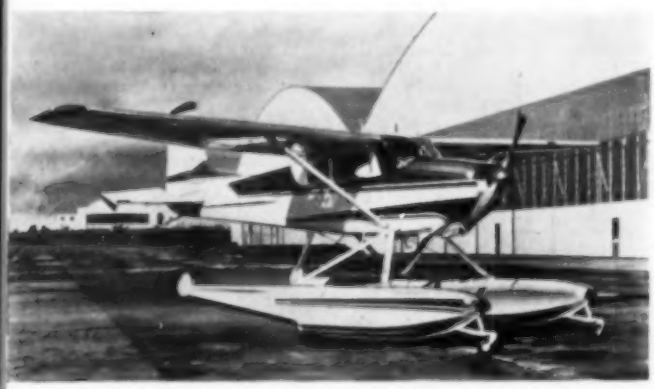
THE EDO AMPHIBIOUS FLOAT

FOLLOWING on the news (*Flight*, February 25th) that D.H. Canada had modified a pair of Edo floats with retractable landing gear for the Beaver, the Edo company announces the development and production of such equipment for aircraft of the Cessna 180 class. The project was undertaken when the excellent performance of the 225 h.p.-engined Cessna 180 became apparent. The landing-wheel gear has led to a weight increase of only 150 lb per set of floats.

The main wheels of the Edo gear are mounted just abaft the main step, in a hydrodynamically "dead" area and do not therefore require to be covered by doors. The nosewheels, fully castering, retract forwards so that the legs lie flat along the forward keel, while the wheels project slightly. They are submerged when the aircraft is at rest, but rise clear as soon as speed is gained. Retraction and extension are electro-mechanical, and handling on land is said to be conventional and easy. The brakes, apparently, work well even immediately after immersion.

Several hundred landings and take-offs from both water and land were made to test the new float gear and it is reported that no serious limitations were found, even in winds gusting to 45 m.p.h. There was no tendency to roll or topple in cross-winds. Designated Model 289, the floats have a C.A.A. Type Certificate and may be fitted to any Cessna 180, new or old. They will be on the market in the spring. It is not possible to modify the existing Model 2870 floats from which the 289s are derived.

The new Edo model 289 amphibious floats shown fitted to a Cessna 180, the type for which they were developed. The new gear does not greatly affect the performance of the aircraft.



Edo's first amphibious floats were for the Waco four-seat light aircraft in 1936, but the performance of that aircraft was too small for the extra burden. The next project came during the war, when amphibious floats were required for transport aircraft taking part in the invasion of islands in the Pacific. This resulted in the fitting of 42ft-long floats to the C-47. Another, much smaller, set of amphibious floats was fitted to a 300 h.p. Stinson L-1. But it was not until aircraft with plenty of reserve power appeared, such as the Beaver and Cessna 180, that the proposition became really practicable.

The Model 289 floats are built at Edo's College Point, Long Island factory, and those for the Beaver by the company's Canadian licensees, MacDonald Brothers Aircraft Co., Ltd. These latter are then modified by D.H. Canada. Considerable interest is reported to have been shown in the new floats by American private owners and also by operators of executive aircraft, whose business calls would in many cases be facilitated by the ability to put down on water.

FORTHCOMING EVENTS

Apr. 15. Helicopter Association: "Noise Problems in Helicopter Design," by Prof. E. J. Richards, M.A., B.Sc., F.R.Ae.S.
Apr. 15. Scientific Instrument Manufacturers' Association: Annual Dinner and Dance, Dorchester Hotel, London.
Apr. 16. British Interplanetary Society (North-West Branch): Film show.
Apr. 19. R.Ae.S. Section lecture: "Thermoelasticity," by Prof. W. S. Hemp, M.A., F.R.Ae.S.
Apr. 19-21. R.E.C.M.F. Radio Components Show: Grosvenor House, London.
Apr. 20. Women's Engineering Society: "Industrial Trends in the U.S.A.," by speaker from U.S. Information Service.
Apr. 20. Institute of Welding: Annual general meeting, followed by film and light entertainment.
Apr. 21. R.Ae.S. Main lecture: "Aeronautical Research in Sweden," by Major Bo. K. O. Lundberg, F.I.A.S., F.R.Ae.S.
Apr. 23. British Interplanetary Society (Provisional Yorkshire Branch): "History of Rocketry," by L. S. Strickson.
Apr. 24. Denham Flying Club: Tea patrol.
Apr. 26. Institute of Transport: Informal luncheon.
Apr. 26. R.Ae.S. Section lecture: "Aerial Systems for Aircraft," by R. A. Burberry.
Apr. 30. R.Ae.C.: First National Air Races meeting, Fairwood Common, Swansea.
Apr. 30. R.Ae.S. Graduates and Students Section: Visit to Vickers-Armstrongs.
Apr. 30. Institute of Welding: "Oxy-acetylene Pressure Welding of Aircraft Undercarriage Components," by J. J. Wilson and D. C. Brown.
May 2-13. British Industries Fair: Olympia, London, and Castle Bromwich, Birmingham.
May 3. R.Ae.S. Section lecture: "Plastic Structures," by G. C. Hulbert, B.Sc.
May 4. R.Ae.S Graduates and Students Section: "Technical Aspects of Supersonic Aircraft Design," by E. J. Catchpole, M.S. in Ae., B.Sc. (Eng.), M.I.A.S., Grad R.Ae.S., and W. J. Egginton, B.Sc., Grad., R.Ae.S.
May 7-9. Channel Islands Aero Club: International rally.
May 12. Women's Engineering Society: "Heavy Civil Engineering Works," by C. K. Haswell, B.Sc. (Eng.), M.I.C.E.
May 14. British Interplanetary Society: Short paper evening.
May 19. R.Ae.S.: The 43rd Wilbur Wright Memorial Lecture: "Flight Control," by Dr. C. S. Draper, F.I.A.S.
May 20. Institute of Navigation: "Automatic Dead Reckoning Instruments," by H. C. Pritchard.
May 21-23. Zoute Aviation Club: International rally.
May 26-28. R.A.E., Farnborough: 50th Anniversary Celebrations.
May 29-30. Aero Club of Ireland: Air Pageant and Flying Display.
May 29-30. S.M.A.E.: British National Model Aircraft Championships, R.A.F. Station Waterbeach.
May 30. R.Ae.C.: Second National Air Races meeting (in conjunction with S.S.A.F.A. air display), Yeadon.
May 30. Royal Netherlands Aero Club: International Air Display: Ypenburg.
June 1-11. British Plastics Exhibition and Convention: Olympia, London.
June 4-5. Royal Air Forces Association: Annual Conference.
June 7-10. Institute of Transport: 1955 Congress, Southport.
June 10-19. Paris Aero Show
June 11. R.Ae.C.: Third National Air Races meeting, Bristol.
June 11. Royal Air Forces Association: Air Display, R.N.A.S. Sydenham, Belfast.
June 11. Women's Engineering Society: Visit to London Airport.
June 11. Aircraft Golfing Society: Match v Racing Club de Paris, La Boulie, Paris.
June 17-20. Palermo Aero Club: Seventh Tour of Sicily.
June 17-24. F.A.I.: General conference.
June 18. R.N.A.S. Eglinton, Northern Ireland: Air Day.
June 18. R.N. Electrical School, H.M.S. "Ariel," Worthy Down, Winchester: Air Day.
Sept. 5-11. S.B.A.C. Show, Farnborough.
Dec. 16. London Airport inauguration by H.M. the Queen.

R.Ae.S. Branch Fixtures (to May 9)

April 11, Halton, Films. April 13, Glasgow, Annual general meeting; Preston, Annual general meeting and film show. April 14, Glasgow (main lecture), "Mixed Power in Modern Aircraft," by M. J. Brennan. April 19, Belfast, Annual general meeting. April 20, Coventry, Annual general meeting and films; Hatfield, Discussion evening. April 21, Southampton, Nuclear Power Plants; Yeovil, "Carrier Operations (Wyvern)," by Lt-Cdr. C. E. Price. April 26, Boscombe Down, "The Light Fighter," by W. E. W. Petter. April 27, Gloucester, Annual general meeting and film show. April 28, Yeovil, Annual general meeting. May 4, Luton, Naval Aircraft; Weybridge, Annual general meeting. May 9, Halton, "The History of Parachuting and Ejection Seats," by R. D. Trender (Junior member).

THE INDUSTRY

To Facilitate Engine-handling

IT will be recalled that in the issue of *Flight* for November 26th, 1954, we described the Scoba "Engine Porter," to be made by Aerocontacts, Ltd., of Gatwick, Surrey. Now another type of engine-handling equipment—which, like the "Porter," is of Canadian design—has been added to the company's range of maintenance equipment.

Radial engines are usually crated with the airscrew shaft in the vertical position. Lifting the engine and turning it through 90 deg in order to install it in the aircraft or mount it on a work stand normally involves the use of two slings and lifting tackles, and a considerable expenditure of time and effort. The Scoba engine tilting sling, it is stated, makes this process a quick, one-man operation.

The sling consists primarily of an I-section beam curved through an arc of 90 deg. This beam is suspended from the hoist by means of an eye and a bracket provided with small wheels—in effect a miniature trolley running along the upper flanges of the beam. At one end of the beam is a screw-on attachment to hold the crankshaft nose; at the other is a small yoke carrying attachments for the crankcase eyebolts.

With all attachment points secured, the engine can be lifted from its case and, on movement of the beam in relation to the hoist suspension bracket, can be tilted through 90 deg down to the crankshaft-horizontal position. Furthermore, the trolley can be locked at one end of the beam and the crankshaft-nose attachment released, thus making it possible to swing the beam clear and permit the nose to be offered-up to the Scoba "Engine Porter" maintenance stand. Appropriate attachments are available for particular types of engine.

Redifon Navigation Beacons

TWO Redifon G.54 medium frequency locator beacons, sited one at each end of the main instrument runway at London Airport, have now given trouble-free service for over four years. They are well known to airline crews as "Oboe William" and "Oboe Easy."

The company has since developed and produced three further types of radio beacon, called G.40, G.91 and G.142. The first is a 500-Watt transmitter which can be remotely controlled from up to five miles away. The G.91 has greater power (2.5 kW) and is suitable for aviation or marine service. The last is a portable 80-Watt beacon designed for economy of operation, and some examples are being carried in the trucks used by exploration parties of a large oil company in the Middle East, in order to help supply aircraft to find them.

In B.E.A.'s engineering base: recharging the hydraulic accumulators of one of the Corporation's newest Viscounts, G-AMOM, "James Bruce." The control panel seen in the foreground is made for this duty by I.V. Pressure Controllers, Ltd.; the reducing valve regulates a 3,000 lb/sq in input from zero to 1,800 lb/sq in.

Industrial Health and Safety

AS part of its campaign for furthering industrial health and safety the Ministry of Labour has completely reorganized the former Industrial Museum at 97 Horseferry Road, London, S.W.1. On March 27th Sir Walter Monckton, Minister of Labour and National Service, formally renamed the museum the Industrial Health and Safety Centre.

The only one of its kind in the country, the building holds a permanent exhibition of methods and appliances for promoting safety, health and welfare in industry. It now houses an up-to-date collection of exhibits, many of which are lent by manufacturers and can be demonstrated in use. In the field of health, the exhibits cover industrial diseases, protection for the respiratory system, both by the use of breathing apparatus and by suppression of dust; first-aid equipment; protective clothing; efficient lighting and colour schemes; and various aspects of employee welfare.

Exhibits under the heading of safety include machine fences; protective devices for electrical apparatus; practical interpretation of building regulations; and fire prevention.

The centre is open from 10 a.m. to 4 p.m. daily (Saturdays, 10 a.m. to 12 noon) and Inspectors of Factories are on duty to conduct parties of visitors (parties from factories, industrial associations, etc., should give advance notice of their visit). A lecture room is available for meetings and film shows.

IN BRIEF

Mr. Leonard G. Packham has been appointed to the Board of C. C. Wakefield and Co., Ltd., whom he joined 30 years ago.

* * *

The sales division of the Aerograph Co., Ltd., has moved to new offices at 47, Holborn Viaduct, London, E.C.1. The factory and head office remain at Lower Sydenham.

* * *

Issued by the British American Optical Co., Ltd., 39 Hatton Garden, London, E.C.1, are catalogues of diamond-impregnated, metal-bonded tools and "Centriforce" abrasives.

* * *

Mr. L. Kearton Parker has joined Winston Electronics, Ltd., as chief sales engineer. He was formerly with the Automatic Telephone Co., Ltd., and subsequently the Telephone Manufacturing Co., Ltd.

* * *

The Northern Aluminium Company's Banbury works, where their high-strength alloys for the aircraft industry are mainly produced, are now in process of extensive modernization. The reorganized mills will include a new hot mill capable of rolling ingots of over a ton in weight.

* * *

Titanine, Ltd., report a profit, for the year ended December 31st, 1954, after all charges but before taxation, of £74,706 (1953, £81,946). Taxation absorbs £45,029 (£46,880). At a recent Board meeting a final dividend of 15 per cent plus a cash bonus of 10 per cent was declared.

* * *

Metal Industries, Ltd., have announced the formation of a new subsidiary, Metind, Ltd. They are initially undertaking, in a new factory, work of a repetitive nature including manufacture and assembly of small sub-units required by other member companies of the group, mainly in the electrical and engineering divisions. The board consists of Messrs. K. N. Swash (chairman and managing director), F. R. Livock and T. D. Turner. Head offices of Metal Industries, Ltd., are at Universal House, 60 Buckingham Palace Road, London, S.W.1.

* * *

Jenolite, Ltd., specialists in anti-corrosion and other industrial chemicals, have moved into larger London offices at 13-17 Rathbone Street, London, W.1. (Museum 5411).

* * *

Wickman, Ltd., machine tool manufacturers, of Coventry, announce that Mr. E. A. Hyde, M.I.I.A., has been appointed deputy managing director and Mr. W. V. Hodgson, M.I.P.E., assistant managing director.

* * *

Wilson and Rodger, consulting engineers and designers of Western Avenue, London, W.5, announce that, following the retirement of Mr. A. C. Wilson, they have changed their name to Rodger Setterington and Partners. Mr. D. W. Setterington has been a partner for the past eight years. The firm, whose policy will remain unchanged, were retained as consultants by B.E.A. for overhaul docks for Dakota, Elizabethan and Viscount aircraft, and they are at present working on a similar project for B.O.A.C.'s Britannias.

* * *

Cockshutt Farm Equipment, Ltd., has announced that it has entered into an arrangement with the Aluminium Castings Co., Ltd., of Glasgow, whereby the latter company is taking over (on behalf of its subsidiary company, Burnley Aircraft Products, Ltd.), the operations previously carried out by Cockshutt Aircraft, Ltd., at Renfrew, Ontario. A new subsidiary of Aluminium Castings has been incorporated in Canada, assuming, from March 31st, responsibility for the operations at Renfrew. This work is to be extended to include reconditioning of gas-turbine components.

ROLLS-ROYCE

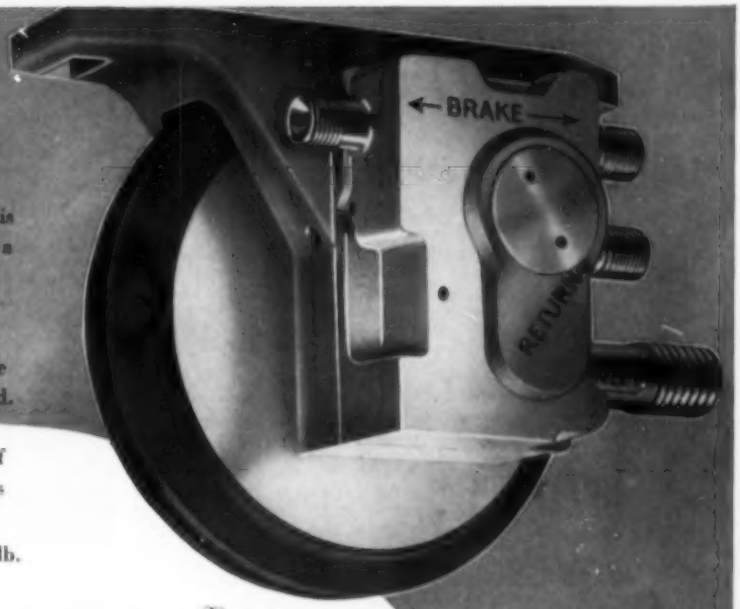
AERO ENGINES LEAD THE WORLD

The only propeller turbine engined airliners in service in the world are powered by Rolls-Royce.

Brake control systems
incorporating the 'MAXARET'
Anti-skid Unit represent the greatest
advance in aircraft braking
since the introduction of the Dunlop
plate brake. The diagram
illustrated opposite shows a typical brake
system using these components.

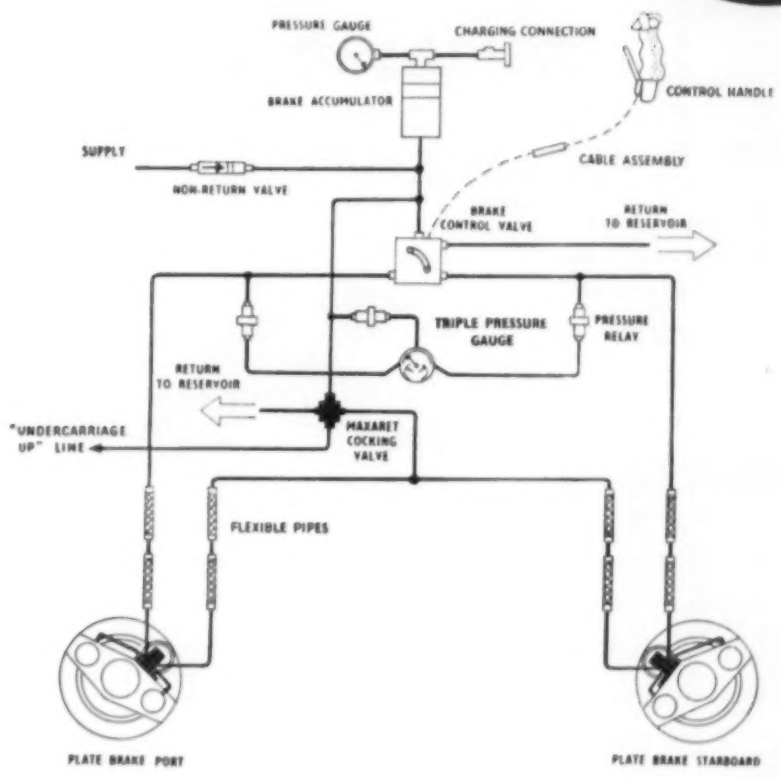
DUNLOP

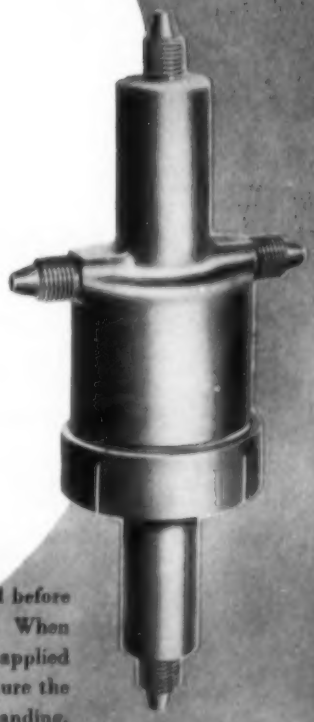
'MAXARET' BRAKE
CONTROL SYSTEM
means safer,
more economical
operation



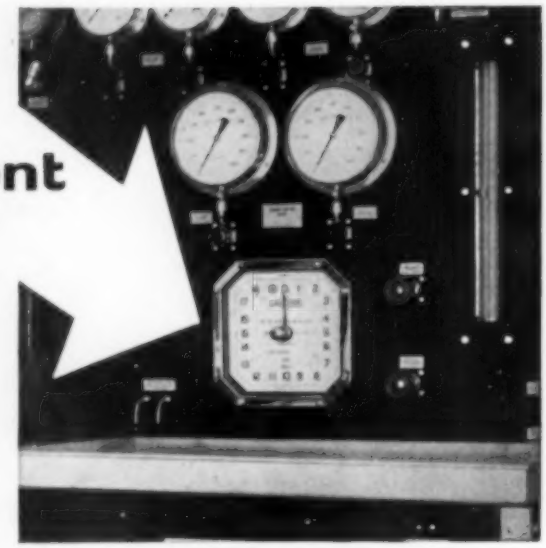
In the 'Maxaret' the control valve is regulated by a fly-wheel housed in a rubber-tyred shell which is rotated by contact with the landing wheel. Excessive deceleration releases pressure in the brake and closes the supply until wheel speed is regained. Provision is made for holding off brakes in a 'bounce landing'. Chief advantages are shorter landing runs and prolonged tyre life.

SIZE $4\frac{1}{2}$" x $3\frac{7}{8}$" x $2\frac{1}{4}$" *WEIGHT* 4·7 lb.

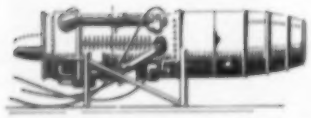




This valve prevents the brake being applied before the wheels are freely rotating after touch-down. When 'Undercarriage Up' is selected the brakes are applied until retraction is complete. On releasing pressure the 'Maxaret' Units are cocked ready for landing.



Fluid-measurement must be exact



Test rig work on jet engines and accessories demands dependable accuracy —and in this test rig Messrs. Rolls-Royce Ltd., Armstrong Siddeley Motors Ltd., Bristol Aeroplane Co. Ltd., and other famous firms rely upon an Avery-Hardoll meter for the important function of measuring fuel flows. On test rig and other applications where accurate fluid measurement is called for, specify meters by Avery-Hardoll.

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The G45 Camera Gun
Length 12¼" Width 3¼" Height 5"
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CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Deck-landing Floatplanes

WHILST not doubting that an aircraft from H.M.S. *Resolution* successfully landed on H.M.S. *Ark Royal* (Correspondence, February 25th) may I put forward the claim that the particular Swordfish on floats, illustrated on your Correspondence page of February 11th, was one of two such aircraft in H.M.S. *Valiant* flight?

The serial numbers of the aircraft were K.8363 and P.4197 noon on July 3rd, 1940, at Oran. The two aircraft had been catapulted off *Valiant* to spot on this unhappy occasion, and became short of fuel before the action had concluded—at a time, in fact, when it was impossible for the ships to cease firing or manœuvre to pick up aircraft in the normal way. Consequently the Swordfish were diverted to H.M.S. *Ark Royal* and landed on, as shown—without D.L.C.O., difficulty, or damage.

I was one of the crew of one aircraft, together with P.O. Plt. (now Lt-Cdr.) J. E. Breese and Sub-Lt. Starmer. The other aircraft had as pilot Lt. (now Lt-Cdr.) H. S. McN. Davenport, with Lt. (now Lt-Cdr., Rtd.) V. N. Graves and Ldg. Amn. Williams. It was to me a novel experience, but both pilots appeared to take it in their stride.

The serial numbers of the aircraft were K.8363 and P.4197 respectively, should the numbers be identifiable in the original photographs. Both were known indiscriminately as "Mitzi" (as were their replacements) for one of them was the original "Mitzi" inherited from H.M.S. *Barham* and alleged to have been first embarked in that ship in 1937.

After the deck-landing incident both aircraft carried on their sterling work until, during 1941, after sundry float and mainplane changes as a result of hitting buoys (and on one occasion a balloon cable) at dreary dawn and difficult dusk in Alexandria Harbour, one was retired ashore for spares. The other came to a watery end near Crete at the time of the German invasion of the island. Her heart was willing but a mishap occurred, and she "went in" off catapult—yet another novel experience.

Your correspondents have revived pleasant memories of a period which, oddly enough, now seems almost halcyon. In return the least I can do is to speak up for two ladies who are in no position to do so themselves.

Worcester Park, Surrey. R. P. TOLLEY,
Lieutenant-Commander, R.N.

Harnessing the Passenger

THE conflicting demands of performance and economy make the design of an airliner a most difficult task, and frequently the virtue of adopting safety features is weighed carefully against the cost in payload. A notable instance of this is the problem of selecting backward- or forward - facing seats, controversy over which has raged so long that the salient claims made on each side hardly need repeating. However, I venture to raise the question again to air an original solution.

The harness designed by Mr. Prizeman.

Arguments on the matter invariably accept that only a lap-strap is available for the passenger. But what is responsible for the absence of *four-point harnesses* on passenger seats? Although it might ungenerously be suggested that it originated in a saving of weight (for far bigger loads have to be catered for with a shoulder harness), the reasons usually quoted are embarrassment to passengers and bad psychological effects. These last points probably have some truth; but does that justify the use of mere lap-straps in light aircraft? A survey by the United States Air Force of recorded crash landings by single-engined aircraft revealed that death was six times more probable if only a lap-strap was utilized.

I suggest that aircraft occupants could be given extra (and much-needed) protection by the adoption of a harness of a type which I have recently provisionally patented; in this, a lap belt of conventional form is supplemented by shoulder straps when extra body restraint is required. Normally these straps are automatically stowed in the seat-back adjacent to the shoulders, so the passengers need not be aware of them. The straps may be passed vertically or diagonally down to the lap strap, and may be secured at points on each side or to the central fastening. Should the occupant wish to have little lateral restraint, or be a woman, diagonal fastening is more desirable. In a convenient arrangement shown in the diagram, the shoulder straps (which may be of nylon cord) are passed over hooks or guides secured to the belt before being fastened at the centre. This ensures that the shoulder straps do not cause any inconvenience to the wearer when releasing in an emergency. A compact release, less bulky than a Service four-point box, is required.

This harness would permit the passenger to travel facing the way he prefers, in safety of a degree equivalent to that possible in a backward-facing seat, whilst, additionally, an immeasurable increase in comfort and security is offered at all times. Thus passengers might be advised (for their comfort) to fasten the shoulder straps in rough weather or ordered (for their safety) to fasten them should an accident—say ditching—seem imminent.

Chalfont St. Giles. R. PRIZEMAN.

The Aero Commander

HAVING greatly enjoyed reading Mr. C. M. Lambert's fine article on the Aero Commander Series 560 purchased by Yemen Airlines (December 24th issue) and "C.M.L.'s" further interesting information on this type ("Twins Mean Business," January 14th issue) I thought perhaps your readers might be interested to learn something of the Commander's background history.

Credit for highly successful design and excellent performance of this aircraft goes mainly to Ted R. Smith, brilliant young American aeronautical engineer who has devoted the past eight years to seeing his "dream" become an accomplished fact. During the war he worked at Douglas Santa Monica, where he was responsible for much design work on the A-20 Boston and Havoc series and its development, the A-26 Invader series. In 1944 he became closely associated with a small group of engineers, including A. H. Moore, R. O. Absher, L. J. Anderson, Harry Barton, Ernest Bahr Williams Hobbs and others. By the end of 1945 they had arrived at the final design drawings together with engine installation, performance data and so forth. In August 1946 they commenced tooling and building the original prototype, which was actually completed and first flown on April 28th, 1948. Some 32,000 man-hours went into the original design whilst another 10,000 hours was later spent on improvements and "mods" for the first production aircraft.

Rufus T. Amis, an Oklahoma City business and aviation enthusiast of many years' standing, together with George T. Pew, Philadelphia engineer and private pilot, were chiefly responsible for the formation of the company in 1951; these men are president and chairman respectively. Another of the best brains of the firm is Carl Wootten, who joined as sales manager in 1951.

Even highly critical sections of the U.S. aircraft industry have, I understand, been greatly impressed with the remarkable speed with which the Commander has come off the production lines since 1952. With a total factory staff of only just over 300, over 180 aircraft have already been produced and sold to buyers in the U.S.A. as well as to several overseas.

Bearing in mind that the Aero Commander is virtually in the same executive-class category as the Twin Bonanza and, to a lesser degree, the smaller and less expensive Apache and Cessna 310, it once again serves to remind those in the British aircraft industry that if "X" manufacturer has the necessary drive and initiative plus financial backing (not Government), and no matter how small and compact his little company may be, if he builds an aircraft of superior design and performance in "Y" category, then he should go all out for Commonwealth and foreign markets, preferably the former. Here in British East Africa there is a great predominance of modern American types such as Cessnas, Bonanzas, Pipers and Stinsons as compared with very few post-war Austers and Chipmunks and a larger number of 1939 Vintage Miles, Percival, Avro and de Havilland types.

Nairobi, Kenya. DENNIS M. POWELL.

Left, a general view of the aerodrome-control section of the new tower at London Airport. In the foreground is the outbound radar controller, while the two (dark) airfield surface-movement indicators are also visible. Seated at one of these (below), the ground controller has also an airfield lighting "mimic" diagram. The lighting switches are in the background. Bottom, two aspects of approach control; the A.C.R. operators (left) controlling the Watford and Epsom stacks respectively, and the approach-control supervisor in front of the wall map display. The G.C.A. controller and a further surface-movement indicator are soon to be housed in the approach-control section. "Flight" photographs

CIVIL AVIATION

L.A.P.'s NEW TOWER

THE new control tower at London Airport is due to begin operation on April 17th, and during a recent visit *Flight* was able to learn something of its impressive facilities. (Other photographs of L.A.P. Central appear on pages 446-8).

The tower is nine storeys and 127ft high and is topped by the aerodrome-control penthouse, while the sixth and seventh floors contain the approach-control room. Aerodrome control is divided into ground and air control. The former is concerned with ground movements of both aircraft and vehicles, and the relevant equipment includes runway, taxiway and approach lighting controls, "mimic" display of aerodrome lighting, R/T communication with aircraft and vehicles, and Decca "Q-band" radar for watching airport movements in bad visibility. The air controller is responsible for aircraft about to take off and also, in good weather only, for those landing. He is assisted by an outbound radar controller, who views one of three display consoles coupled to the Cossor Airfield Control Radar Mk 6.

The other two A.C.R. consoles form the most important equipment in the approach-control room, situated below aerodrome control. Here, the two radar controllers guide aircraft in from the Epsom and Watford stacks respectively, using the "twin-stack feed" system (i.e., using both stacks at the same time) when the east-west runway is in use. When 6-7 miles from the airport, the approaching aircraft is handed over, if necessary, by the approach radar controller to the G.C.A. "talkdown" controller, who directs the final stages of the approach. The talkdown controller operates at present from the G.C.A. caravan near the runway, but later will move into the tower's approach-control room. Using full talkdowns, a three-minute landing rate can be achieved: using techniques such as radar-monitored I.L.S. landings, however, this figure can be improved and a peak movement rate (landings and take-offs) of 50 aircraft per hour is planned for the immediate future.

The airport's telecommunications network includes information services known as "telemove" and "teletalk" respectively, controlled from the tower buildings. The first is a telegraph "ticker-tape" system by which operators, immigration, customs, tarmac control sections and others receive notice of aircraft landings, movements and other messages, and the second is an inter-office radio-telephone loudspeaker system. Other tower equipment includes "Mufax" chart recorders and telegram facsimile equipment, for the reception of meteorological data.

THE 180th VISCOUNT

AN order for a V.I.P. version of the Vickers Viscount—the second contract of its kind—has been placed by the Pakistan Government on behalf of the Governor General of Pakistan. Designated by the type-number 734, the Pakistan Viscount will have accommodation for 24 people in three separate compartments. The forward V.I.P. saloon will have two divan beds, two aft-facing chairs and side tables, and the central saloon will have four-abreast seating for 16 people; four of these seats will face aft and 12 will face forward. Servants' quarters, with six seats, occupy the rear compartment, aft of which will be the galley with a cooker and refrigerator. Navigational equipment in the Viscount 734 will include a Kelvin Hughes periscopic drift sight, Rebecca Mark 4, periscopic sextant, air position indicator, elapsed-time clock, radio compass and compass repeater. The Pakistan order brings the number of Viscounts sold to 180.

I.A.T.A.'s FIRST HELICOPTER MEMBER

MEMBERSHIP of I.A.T.A. was increased to 72 airlines last week by the admission of New York Airways, first scheduled all-helicopter airline to join the Association. With a fleet of five S-55s, New York Airways operate between New York's metropolitan airports and to suburban communities in New York, New Jersey and Connecticut. As a domestic carrier, the company will be an associate member of I.A.T.A.; it will not vote on fares and rate matters in the traffic conferences, but will take part in I.A.T.A.'s efforts to develop the exchange of traffic between companies and to further the commercial use of helicopters.

INDIAN AIRLINE NEWS

REPLYING to a question in the New Delhi parliament last month, Mr. Jagjiwan Ram, India's communications minister, said that no decision had yet been reached on the question of buying Viscounts for domestic service with I.A.C. He added that during the past two years three committees had evaluated the respective merits of the Viscount and the Convair 340, and confirmed that all three committees favoured the British airliner. Mr. Ram also revealed that Air-India International proposed to increase the frequency of their service between India and Britain, now operating four times weekly, because of increased traffic potential. He added that services to China and Japan would be inaugurated as soon as bilateral agreements were concluded.

As previously reported in *Flight*, the Indian flag carrier will, from May 10th, connect London, Rome, Cairo and Bombay with Prague by routing one flight per week through the Czech capital.

B.E.A.'s COMING YEAR

WRITING in the Corporation's house magazine, Mr. Peter Masefield, chief executive of B.E.A., states that the current financial year, which began on April 1st, will be the first in which all B.E.A.'s major international and domestic routes will be operated by modern British pressurized aircraft. The Corporation is budgeting to fly 45,500 Viscount hours and 30,400 Elizabethan hours in the 12 months ahead.

Among new services planned by B.E.A. are "Festival" Viscount flights between London and Edinburgh, starting on April 17th, extra Viscount services to Glasgow and Belfast from June 1st, and Pionair services to Salzburg, a point not previously served by B.E.A. This latter route will be operated with a new version of the Pionair, with 24 three-abreast reclining seats.

Mr. Masefield quotes early May as the proposed starting date for the scheduled helicopter shuttle service between the South Bank and London Airport with two Westland Sikorsky WS-55s.

This attractively styled DC-3 is one of 13 operated by Ozark Air Lines. It is seen over St. Louis, centre of the company's extensive network of local services. Last year Ozark carried 156,000 passengers.

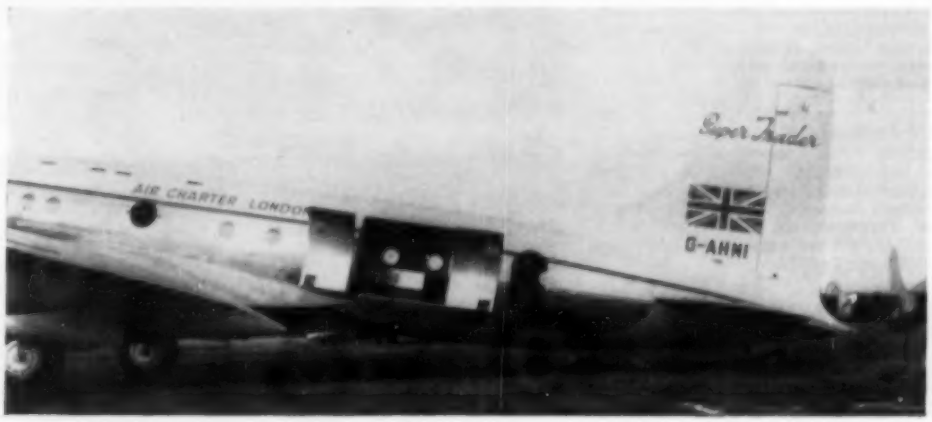
These flights will follow the line of the river Thames between the South Bank and Kew Bridge, the sector between Kew Bridge and London Airport Central being flown direct—a total distance of 17 miles. The route will be flown five times daily in each direction and the single fare will be 35s.

To enable them to make emergency alightings on the Thames in the case of engine failure, the helicopters will carry flotation gear weighing 400 lb "including a 20 lb emergency anchor and cable"; to ensure relative quietness they will also be fitted with a 96 lb exhaust silencer. Thus modified, the WS-55 will have a normal payload of four passengers instead of, typically, seven, and its cruising speed will be 10 m.p.h. lower. Mr. Masefield adds that there can be no question of making the service pay, as the aircraft will cost about 32s per mile to operate on this route.

On this basis, the service can be expected to lose some £200 daily, assuming ten flights per day with a full passenger complement on each flight.

PILOTS' PARLEY

MONTREAL will be the venue of the 10th conference of the International Federation of Air Line Pilots Associations, which is to be held from April 14th to 20th inclusive. Founded in London in April 1948, the Federation is made up of 21 pilots' associations, representing some 14,000 airline pilots. Chairman of the conference will be Mr. C. N. Sayen, president of I.F.A.L.P.A. and of the American Air Line Pilots Association. The British delegation will consist of Capt. P. E. Bressey (technical adviser), Capt. R. T. Merrifield and Capt. V. G. Parker. The list of subjects to be discussed is a lengthy one; it includes such topical questions as crew complements, flight-time limitation and airborne radar.



"Super Trader" is the name conferred by Air Charter, Ltd., on their cargo version of the Tudor 4B, which can carry up to 11 short tons of freight and can operate a stage-length, with 11,000 lb payload, of 2,800 n.m. Lack of a large loading door, main obstacle to the use of Tudors for all types of heavy charter work, was made good by the company's own engineers at Southend. Forward of the normal passenger door is a large cut-out, providing a loading area 6ft 10in wide by 5ft 5in.

The pleasing lines of Renfrew's new terminal are well defined in this night view. B.E.A. Viscount and Pionair services connect Renfrew, domestic airport for Glasgow, with London, Manchester, Birmingham and Belfast.

CIVIL AVIATION . . .

BREVITIES

LATEST airline to adopt a credit travel plan is Sabena, from whom air tickets are now available on a ten per cent down payment, with the balance spread over 6, 12 or 21 months. This scheme is operated in conjunction with United Dominions Trust, Ltd.

* * *

An automatic Zero Reader has been fitted to one of K.L.M.'s link trainers at Schiphol Airport. Two further such installations are planned.

* * *

During the forthcoming summer season Aer Lingus will operate for the first time to Biarritz and Barcelona. Both points will be served by extending the seasonal Dublin-Lourdes route.

* * *

The Portuguese civil aviation authorities have purchased from International Aeradio, Ltd., the basic units of an air traffic control trainer, capable of being used for aerodrome approach and airways training. The equipment will be installed later this year at Portela Airport, Lisbon.

* * *

Recent M.T.C.A. *Information Circulars* include No. 31/1955 (instrument landing systems frequency assignment), No. 32/1955 (opening of London Airport Central for operational use (see pages 446-8 and 464), and No. 33/1955 (aeronautical charts for civil aviation).

* * *

An illustrated route-map booklet has been designed and produced for Air-India International by Francis Chichester, 9 St. James's Palace, London, S.W.1. Printed in colour, it includes a two-page summary of the principles of navigation.

* * *

A technical advisory panel on Consol has been formed by I.C.A.O. to advise the Air Navigation Commission and member States on technical aspects of siting, installation, operation and maintenance of Consol stations. The U.K. representative on the panel is Mr. J. C. Farmer, deputy director of telecommunications in the M.T.C.A., which operates the British Consol station at Bushmills, Northern Ireland. Consol is one of the I.C.A.O. interim standard long-range navigational aids which provide bearings for both aircraft and ships.

* * *

On the occasion of the 21st anniversary of the founding of South African Airways, an illustrated booklet has been prepared by South African Railways Headquarters, Johannesburg. This describes the history and present activities of S.A.A., and contains route-maps, and messages from the South African Prime Minister and Minister of Transport, the director-general of I.A.T.A., chairman of B.O.A.C., general manager of S. African Railways and the chief airways manager of S.A.A.

Periscopic sextants of Kelvin Hughes manufacture will be fitted in the three Douglas DC-7Bs ordered by South African Airways for service on their London-Johannesburg route.

* * *

B.O.A.C. report good results with an experimental system which began last month, of permitting passengers to select their own seats in aircraft. The system at present applies only to the London-Sydney route.

* * *

A Cinerama-type film showing landings at and approaches to La Guardia Airport, as seen from an airliner cockpit, was demonstrated recently to B.O.A.C.; the Corporation is reported to be discussing the use of such films as training aids with the M.T.C.A. The film, made by PanAm last spring, is intended to give better training at lower cost than is entailed by the use of aircraft.

* * *

Increased transatlantic frequencies are announced by Pan American Airways. In addition to two extra all-sleeper Stratocruiser services weekly in each direction, the airline has increased its all-freight frequency to three round trips weekly—two by DC-6As and one DC-4 flight. From June 1st PanAm will be operating five return flights daily across the North Atlantic, including a daily service from London to Detroit and Chicago.

* * *

A cargo record of 163½ tons in one day between the North and South Islands of New Zealand was flown on March 1st by Straits Air Freight Express, a subsidiary of Airwork, Ltd., using two Bristol Freighters. The use of "cargons"—wheeled platforms enabling the loads to be pre-stowed and trimmed—made possible this achievement.

* * *

Address of the Society of Licensed Aircraft Engineers has been changed from Finsbury Circus House, London, E.C.2, to 1 Bell Street, Maidenhead, Berks (Maidenhead 2774). This transfer does not affect the S.L.A.E. publications office, nor the library/committee rooms, which remain respectively at Effingham House, London, W.C.2, and at London Airport.

Two light aircraft making long journeys are this Czech Aero 45 (top) and Piper Apache. The Aero 45, a gift to Mr. Nehru, is shown at Nice on route from Prague to India; the Apache is being flown from Pennsylvania to Pretoria. Piloted by William T. Piper, Jr., and Howard Piper, sons of the manufacturer, the Apache made the 1,860-mile South Atlantic crossing from Natal to Monrovia, Liberia, in 16 hr.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News

Cranwell Parade

FOR the passing-out parade of the 64th Entry to R.A.F. College Cranwell last Tuesday, Air Chief Marshal Sir Arthur G. M. Sanders, Commandant of the Imperial Defence College, consented to be the reviewing officer. He was also presenting the Sword of Honour, but the General Duties cadets received their wings on the previous day from A. Cdre. H. Eeles, the Commandant of the College.

The prizewinners were: **Sword of Honour, Chance Memorial Prize** and **Abdy Gerrard Fellowes Prize,** Sen. U/Off. F. M. A. Hines; **Queen's Medal and Air Ministry Prize for Imperial and War Studies,** U/Off. J. F. Merry; **Sassoon Memorial Prize,** Sen. U/Off. D. N. Cousins; **R. M. Groves Memorial Prize,** Sen. F/Cdt. S. M. V. Situnayake; **Dickson Trophy** and **Michael Hill Memorial Prize,** Sen. U/Off. J. N. Sawyer; **Hicks Memorial Trophy,** U/Off. R. Horsfield; **R.U.S.I. Award,** Sen. F/Cdt. C. A. Herbert; **Air Ministry Prize for Equipment Studies,** Sen. F/Cdt. D. A. McArthur.

R.Aux.A.F. Appointments

THE Air Ministry has announced the appointment of W/C. R. K. W. Glover, D.F.C., to command No. 3605 (County of Warwick) Fighter Control Unit. During the war W/C. Glover became the gunnery leader of No. 61 Squadron.

The appointment is also announced of W/C. H. S. Linthwaite to command No. 3604 (County of Middlesex) Fighter Control Unit. W/C. Linthwaite is a specialist air gunner and controller, serving in the former capacity with Nos. 215, 149 and 15 Squadrons and as a controller at Tain, Ayr, Turnhouse and Portreath.

R.A.F. Yacht Club

A FULL programme for 1955 has been tentatively arranged by the R.A.F. Yacht Club, which has its headquarters at Hamble, Hampshire. There are three dinghy meetings: Firefly meeting for the Naini-Tal Challenge Cup, August 13th-14th; handicap meeting for open to half-decked and open centreboard boats up to 20ft l.o.a. and Flying Fifteens, June 25th-26th; and ladies' race, September 17th-18th.

Other events include a rally in the Beaulieu River, June 4th; seamanship race, June 5th; race to Yarmouth, Isle of Wight, July 30th; and race from Yarmouth to Hamble, August 1st.

Air Traffic Control Board

EXPECTED to function in a manner similar to that of the Examining Wing of the Central Flying School, an Air Traffic Control Examining Board has been established at R.A.F. Shawbury, Salop.

Under the new scheme, within two years R.A.F. Air Traffic control officers all over the world should have been examined and categorized according to ability and experience. Thereafter examining teams will visit stations at home and abroad to make half-yearly re-categorizations and standardization checks.

For controllers there will be both written and practical examinations and the top categories will be required to handle high-density traffic, to deal with three or four simultaneous descents and to carry out radar talk-down procedure.

The first officer to command the new board is W/C. G. A. L. Elliot, D.F.C., who has eight years' experience of air traffic control in various parts of the world.

Halton Passing-out Parade

AT Halton, last Wednesday, the Lord Lieutenant of Buckinghamshire, Sir Henry Aubrey-Fletcher, was to be the reviewing officer at the passing-out of the 71st Entry of aircraft apprentices. The Queen's Colour was paraded.

The prizewinners of the 71st Entry were: **Cranwell Cadetship, Beauchamp Memorial Prize** and **Air Ministry Prize** (General Efficiency), F/Sgt. App. A. E. Thomson; **Quinton Memorial Trophy,** Sgt. App. H. Gordon; **Pioneer Trophy, Crebbin Robinson Cup** and **Air Ministry Prize** (Air Frame Fitter), A/C. App. R. L. Dodd; **Azhar Memorial Shield,** A/C. App. M. S. Islam; **Elliott Memorial Prize,** Sgt. App. P. G. Turner; **Air Min. Prizes** (Highest in All Subjects and Educational Subjects), Sgt. App. F. O. Hutchings. Air Min. prizes were also awarded to Cpl. App. J. E. Hughes, Sgt. App. D. S. Watson, L. App. D. E. Whitley, L. App. B. Perryman, A/C. App. A. E. G. Best, A/C. App. F. H. Smith, A/C. App. G. J. Smith, A/C. App. H. Milton, A/C. App. J. M. Newton.

A party of 22 officers and members of London University Air Squadron who spent last week in Germany. The Commanding Officer, W/C. I. J. Spencer, D.F.C., is in the centre. The party flew in a Handley Page Hastings, which was fitted with an experimental pannier.

On his way home from his recent visit to the Mediterranean, H.R.H. the Duke of Edinburgh paid a short visit to the R.A.F. in Gibraltar. He is seen being greeted by A. Cdre. G. G. Barrett, C.B.E., A.O.C. Gibraltar.

Locking Parade

ON Tuesday last A.V-M. A. F. Hutton, C.B., C.B.E., D.F.C., Director-General of Engineering, was due to review the passing-out parade of the 71st Entry of No. 1 Radio School, Locking, commanded by W/C. S. Linnard, D.F.C. Over 800 apprentices were on parade.

Kenya Awards

THE Queen has been graciously pleased to approve the undermentioned awards to members of the Royal Air Force for service in Kenya. Extracts from the citations covering the awards are added.

C.B.

G/C. D. J. Eayrs, C.B.E., D.F.C. Serving as Senior Royal Air Force Officer, East Africa, at R.A.F. Eastleigh, Nairobi, from October 1952 to June 1954, G/C. Eayrs was principally responsible for the conduct of air operations against the Mau Mau. His task was to build up the air organization to a state at which it could support the intensive operations of the forces employed. The task, and the responsibilities laid upon him, were for months far beyond the normal resources available, but he maintained his organization continuously in a high state of morale and efficiency. He was involved in all questions of joint planning and co-ordination of policy for the employment of air forces, established R.A.F. relationships with the Army, civil administration and civilian population upon a most excellent footing and maintained the morale and keenness of the R.A.F. at very high level. G/C. Eayrs is now Officer Commanding R.A.F. Station Cranwell.

M.B.E.

F/L.s F. D. Edge and C. H. Edgar. In command of No. 7 Provost and Security Detachment at Eastleigh from the start of the

SERVICE AVIATION . . .

Mau Mau emergency until last August, F/L. Edge harried terrorists seeking to use the airfield as an escape route and hideout. The night of July 21st-22nd, 1954, produced a typical example of his work. At very short notice he and his available men surrounded the isolated station sewage-farm, after which he advanced alone to investigate, and in doing so surprised some 30 to 40 Africans about to hold a Mau Mau oath-taking ceremony. Twenty-two suspects were captured.

F/L. Edgar commanded No. 66 (Field) Squadron Detachment in Kenya from February to May 1954, his responsibility being to protect the airstrip at Mweiga from which Harvards of No. 1340 Flight were operating. When, in March, the operations were moved to Nanyuki, he was responsible for planning and constructing the defences. With skill, and despite difficulties over supplies and equipment, his detachment completed the task quickly. After this he led many patrols, sweeps and ambushes against Mau Mau gangs, co-operating with police.

SECOND BAR to D.F.C.

W/C. G. G. St. David Jeffries, D.F.C. and Bar. On October 31st, 1953, W/C. Jeffries assumed command of No. 1340 (Harvard) Flight in Kenya. For the next eight months he led the Flight from advanced landing fields on anti-Mau Mau strikes. By September 30th, 1954, W/C. Jeffries had personally completed 410 strikes in the Aberdare Mountains and Mount Kenya areas, where violent and unpredictable weather often prevails. He carried out flying investigations of dangerous downdraughts in the area. In September 1954 his Flight, with eight aircraft and an average of seven pilots, flew 508 sorties and 577 flying hours. W/C. Jeffries personally led 89 strikes and flew 95 hours.

R.C.A.F. Station, Cold Lake

THE new R.C.A.F. station at Cold Lake, Alt., is now almost complete (the last 500 married quarters are just being built) and the All-Weather O.T.U. for CF-100 crews is being moved there. The move has been occasioned in large part by the now increased requirements for range facilities which have arisen with the introduction of the new aircraft, and for this purpose some three million acres of land have been rented from Alberta and Saskatchewan. This area is adjacent to the new base. Trainee crews carry out all-weather practice interception of Mitchells and T-33 Silver Stars and of other CF-100s. Technical training units for CF-100s and operational squadrons are remaining at North Bay, Ontario.

In addition to training, the new range is being used for a series of tests of air-to-air guided missiles for the Defence Research Board by the Central Experimental and Proving Establishment Detachment. Work is being carried out in close contact with the Canadian Armament Research and Development Establishment at Valcartier, P.Q. Tests were previously carried out in Eastern Canada.

Reunions

SERVING and retired officer aircrew of the Royal Navy and its reserves, who might be interested in a projected reunion at Lee-on-Solent during early August, 1955, are invited to write to the wardroom mess secretary, H.M.S. *Daedalus*, giving details of their service.

This year's H.Q. Flying Training Command Officers' (1939-45) reunion is being held at the R.A.F. Club, Piccadilly, London, on April 29th. Air Marshal Sir Philip Babington and Air Marshal Sir Lawrence F. Pendred are both expected to be present. Particulars from S/L. A. C. Howell, 19 Bramley Road, Cheam, Surrey.

No. 47 SQUADRON . . . THE HISTORY CONTINUED FROM PAGE 457

Mosquitoes, one of the most successful being that carried out on the telephone exchange. The rockets of the Beaufighters making the attack caused extensive damage to the building, which was left in flames. Towards the end of April the remaining Beaufighter flight converted to Mosquitoes and on the 28th the squadron moved to Kinmagon, whence attacks were made on coastal defences south of Rangoon as a preliminary to the Allied sea-borne invasion, which was due to take place at the beginning of May. In co-operation with other Mosquitoes of 221 Group the squadron carried out "cab rank" patrols, bombing and strafing during the operation.

After the fall of Rangoon attacks were made on villages north of the city and on Japanese troop concentrations at Hmawbi and Mockpalin. Strikes were also made to cut enemy escape routes, continuous patrols being flown over these areas. It was during an attack on the Japanese-occupied village of Lagunbyo on May 15th that the commanding officer was lost: W/C. Filson-Young, D.F.C., who led the attack, was seen to crash, and both he and his navigator were killed.

A Fairey Gordon of No. 47 Squadron escorting the first Handley Page 42 on the Cairo-Kisumu stage of the Capetown service in 1932.

Until the Japanese surrender, operations were continued against a variety of targets over a wide area. Railway bridges on the Moulmein-Bangkok line were destroyed and Moulmein was the object of attack on several occasions.

On August 16th the squadron moved to Hmawbi and on November 24th eight aircraft were detached to Kemajoran in Java for operational work against the Indonesian Nationalists. Attacks were made on radio stations and gun emplacements and tactical reconnaissances were flown over the battle area. Air cover was also provided for road convoys and troops.

In January 1946 the squadron moved its headquarters to Butterworth in Malaya; but operations in Java continued, the detachment earning for itself an excellent reputation for operational efficiency. On March 21st, 1946, the detachment returned from Java and the squadron was disbanded.

No. 47 was re-formed on September 1st, 1946, when No. 644 (Airborne Support) Squadron was re-named. The unit was then located at Qastina under the command of W/C. W. H. Ingle and was engaged in dummy paratroop drops and glider towing exercises; but by the end of the first month of its new life the squadron returned to England, where it was based at Fairford, Gloucester.

For the next two years training formed the greater part of the flying programme, with some ferrying trips to the Middle East; and on September 14th, 1948, a move was made to Dishforth for conversion to Hastings 1 aircraft—the first squadron to be so equipped.

On November 1st the unit joined the Berlin airlift—Operation Plainfare—its main task being the flying of coal from Schleswigland, near Kiel, into the blockaded city. For nearly a year No. 47 performed this work, making 3,000 flights and carrying 22,000 tons of supplies. As well as being flying coalmen, the squadron also helped to carry some of the 33ft girders required for the reconstruction of the West Berlin power station. On July 20th, 1949, a Hastings of No. 47 Squadron carried the half-millionth ton of supplies flown into Berlin by the British air lift force.

On their return to Britain the squadron moved to Topcliffe, Yorkshire, and started their present role of route flying and airborne support. Perhaps the most famous exploit since then was the dropping of supplies to the British North Greenland Expedition, on the ice cap in October 1952. During this operation a Hastings was lost through a misjudgment of height. It struck the snow-covered ground, but remained intact. The rescue of F/L. "Mike" Clancy, and his crew by a ski-fitted Dakota and Grumman Albatross will be remembered.

Since then, based at Abingdon, the squadron has flown Transport Command trunk routes from the United Kingdom to Japan, Singapore, New Zealand, Australia and Canada.

Originally the squadron badge showed a rising sun over the Saqqara pyramid, but in 1938 a crest symbolizing the squadron's history was devised. It shows a demoiselle crane (a denizen of the Sudan and Russia) and a fountain. The fountain commemorates the squadron's amphibious role. The motto, *Nili Nomen Roboris Omen*, may be translated as: "The name of the Nile is an omen of our strength."

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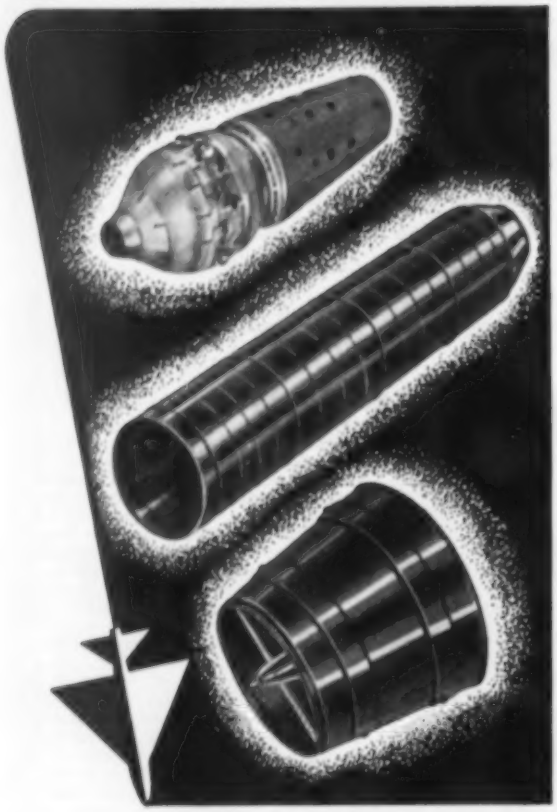

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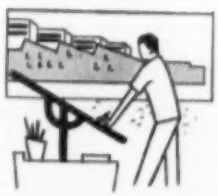

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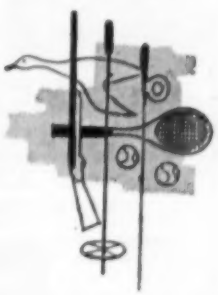

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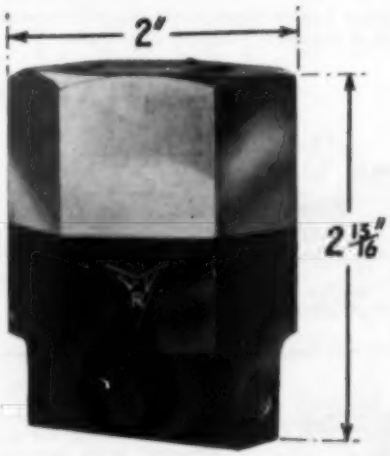

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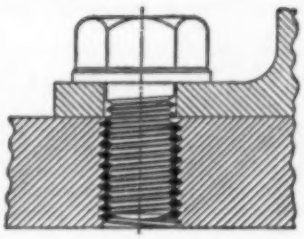

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PUBLIC ANNOUNCEMENTS

AIR TRANSPORT ADVISORY COUNCIL

THE Air Transport Advisory Council give notice that they have received the undermentioned applications to operate scheduled air services:

APPLICATION No. 472. From Manx Airlines, Ltd., of Ronaldsway Airport, Isle of Man, for a Normal Scheduled Service with Dakota aircraft and later possibly with Viking aircraft for the carriage of passengers, supplementary freight and mail between Isle of Man (Ronaldsway) and Bergen (Flesland) with an intermediate traffic stop at Newcastle (Woolsington) at a frequency of from one to six services weekly during the period from 1st January, 1956, to 31st December, 1965.

APPLICATION No. 187/2. From Cambrian Air Services, Ltd., of Cardiff Airport, Near Barry, Glam., for permission to operate to Cardiff (Rhoose Airport) as an alternative or additional traffic stop to Bristol (Whitchurch) the Internal Service on the route Cheltenham (Staverton)-Bristol (Whitchurch), which they are approved to operate for the period up to 1st May, 1963.

THESE applications will be considered by the Council under the Terms of Reference issued to them by the Minister of Civil Aviation on 30th July, 1952. Any representations or objections with regard to these applications must be made in writing stating the reasons and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 3, Dean's Yard, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, should reach them within the period allowed for the making of representations or objections. [3533

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Applications (6 copies), including the names of three referees, should be lodged, not later than 20th May, 1955, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON,
Secretary of University Court.
[3529

CENTRAL AFRICAN AIRWAYS CORPORATION

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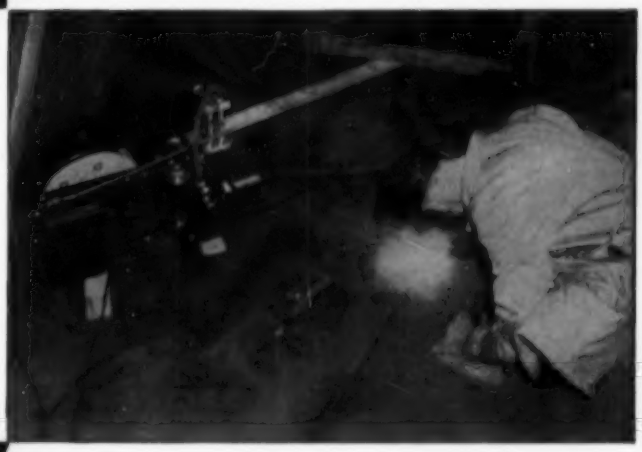

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